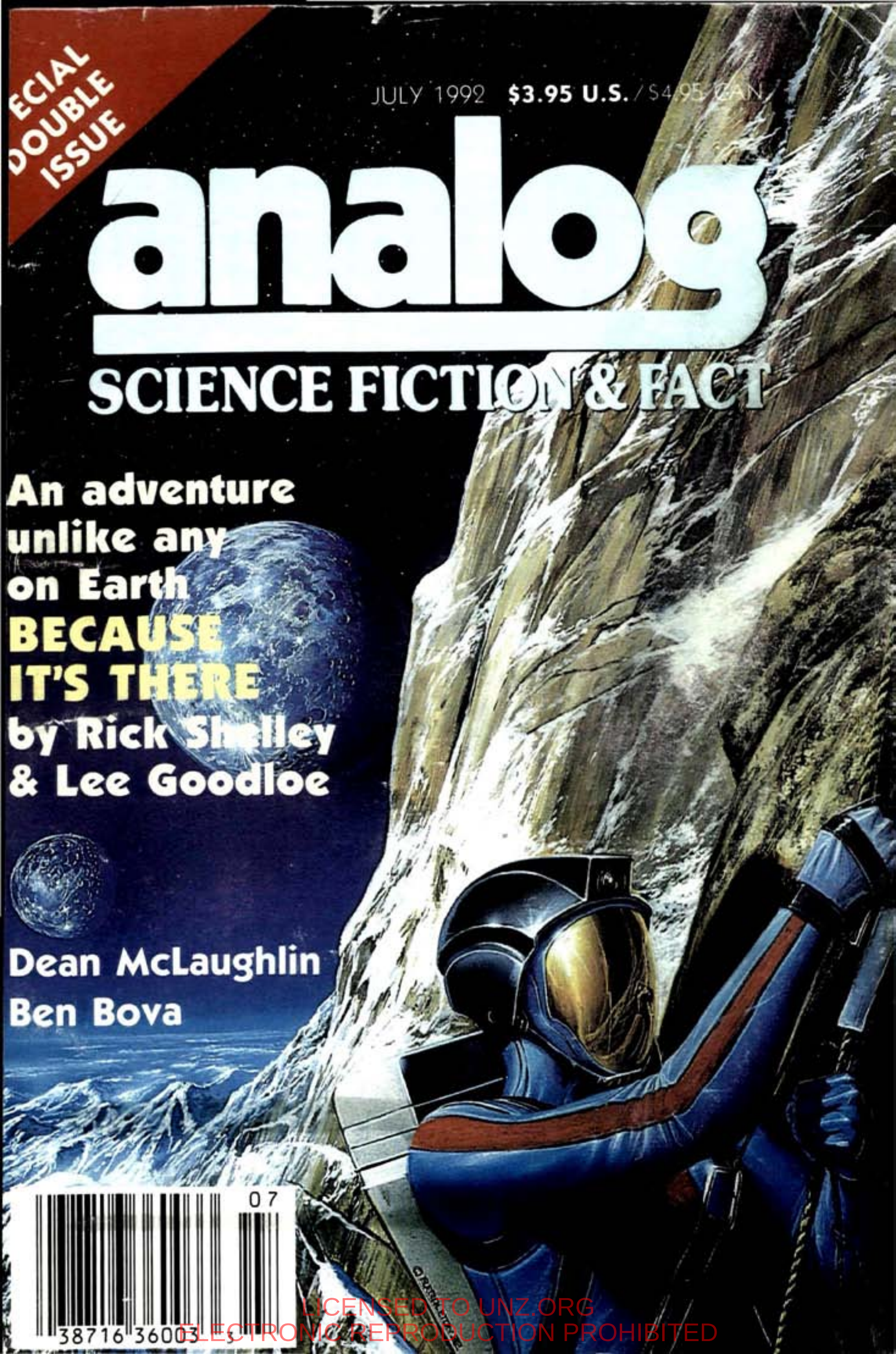

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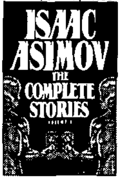
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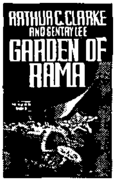
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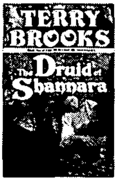
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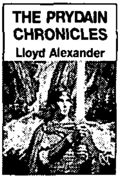
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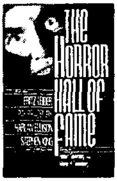
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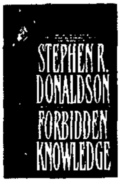
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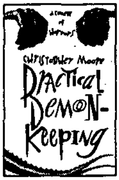
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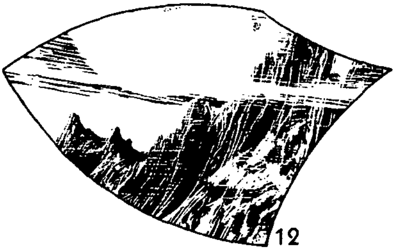
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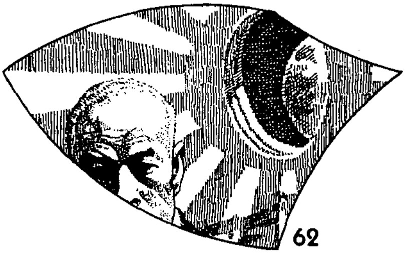
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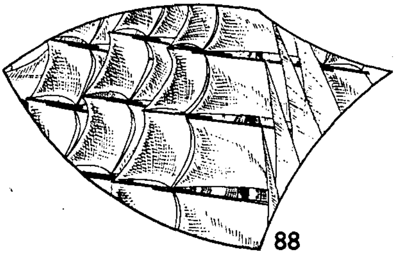
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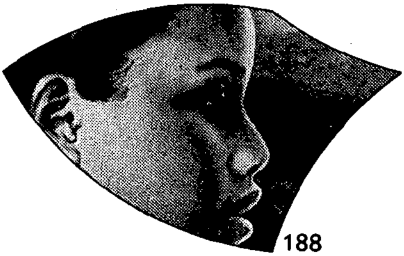
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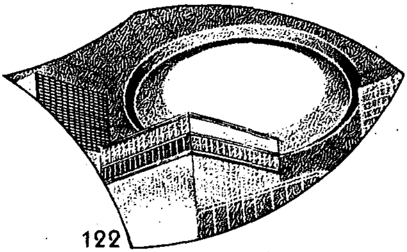

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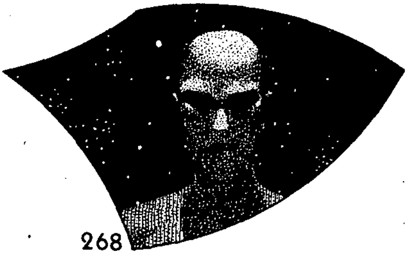

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Editorial

TILTING WITH STRAW MEN

Stanley Schmidt

A*nalog* is an argumentative magazine.

(Did I hear somebody say, "Oh, yeah?")

Yes, we are. It's a game all of us play: writers, editor, readers. As I've explained several times, but find it necessary to repeat periodically, I usually try to stimulate controversy with my editorials—sometimes by advocating or defending viewpoints I don't actually subscribe to. Most of our writers enjoy turning ideas on their heads and looking at them from unorthodox angles. They delight in asking "What if?" about things that conventional wisdom says we're not supposed to question, and exploring possible cultures that work quite differently from ours. Readers enjoy writing to us, or collaring us at conventions, to tell us when they disagree with something we've said.

As I said, it's a game most of us enjoy. If you didn't, you probably wouldn't be reading this magazine. Most of us do a pretty good job of keeping the right perspective on it, remembering that it *is* largely a game and should be played with a spirit of fun.

However, it's a little more than *just* a game. The ideas we play with are often not mere arbitrary game pieces, but very real concerns about how the world works and where we as an intelligent species are going in it. We're talking about things like what control we or our governments should exercise over the beginning and end of life, about whether and why and how we should try to go to the stars, and what we should do if we meet anyone else out there.

People *should* argue about such things, because they're going to have to make real-world decisions about them. The more ideas have been thrown on the table and tested against each other, the better our chances of finding *good* options. The more people have tried to pick holes in all the suggestions, the better the chance that the bad ones will be weeded out.

But for that very reason, that such concerns are important in the real world, people also tend to have strong feelings about them. They've heard *some* of the ideas, they've done some thinking, and they've come up with answers that they've become attached to. Unfortunately, that gets in the way of continuing the discussion or considering new possibilities. When people have decided that they already *know* the answers, they tend to lose patience with listening to other people's suggestions. They don't *want* to play the game any more. They want to take their chips and go home—and send all those annoying competitors home, too.

So they try to take short cuts to get rid of the opposition, which often show up as weaknesses in their arguments. Editing a magazine like *Analog,* which surely gets one of the most interesting mailbags in the world, I've had a lot of opportunity to watch *how* people argue. I've noticed that there are certain traps which are quite common, and so insidious that even very intelligent people often fall into them.

One of those is my topic of the moment: the tendency to cite a position or characteristic as belonging to someone you disagree with, and then attack or ridicule that position and consequently your opponent. If your opponent actually *has* that position or characteristic and you describe it accurately, your argument is valid and demands a serious answer. What too often happens instead is that the view or behavior attributed to your antagonist is an oversimplification of what he really thinks or does. In that case, your argument doesn't mean much at all. You're not really attacking your opponent, but only a "straw man" that looks vaguely like him.

Examples are regrettably easy to come by. I've often heard avid supporters of U.S.-style capitalism shrug off "environmentalists" as "tree-huggers" and "environmentalism" as "an odd new form of nature worship," or

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words to that effect. No doubt this makes the industry-boosters feel smugly superior, but it ignores the fact that there are far subtler forms of environmentalism that cannot be dismissed so lightly by anyone who actually bothers to *listen* to them. On the other hand, there *are* sloppy environmentalists who are horrified at the idea that deer populations need to be controlled and who regard the "military-industrial complex" as an evil monolith, ignoring the fact that some industrialists are very concerned about maintaining a livable environment.

Tilting with straw men is not a weakness characteristic of any particular part of a political or philosophical spectrum. You'll find people doing it on at least two sides of virtually *any* controversy!

Not too long ago we published a story containing several military characters with attitudes that were, shall we say, unhealthy—for other people. We got several letters objecting that military people aren't like that at all, but embarked on their military careers solely because they crave Peace and want to be sure we all get it. Now, there may really be some who did; but I don't for a minute believe that they *all* did, any more than I believe that they're all there solely because of a lust for Power. The real ones I've known have been a good deal more complicated than *either* of those "straw soldiers."

I've found myself bothered on several recent occasions by stories in which demonstrators and activists (always opposing the protagonist!) were uniformly

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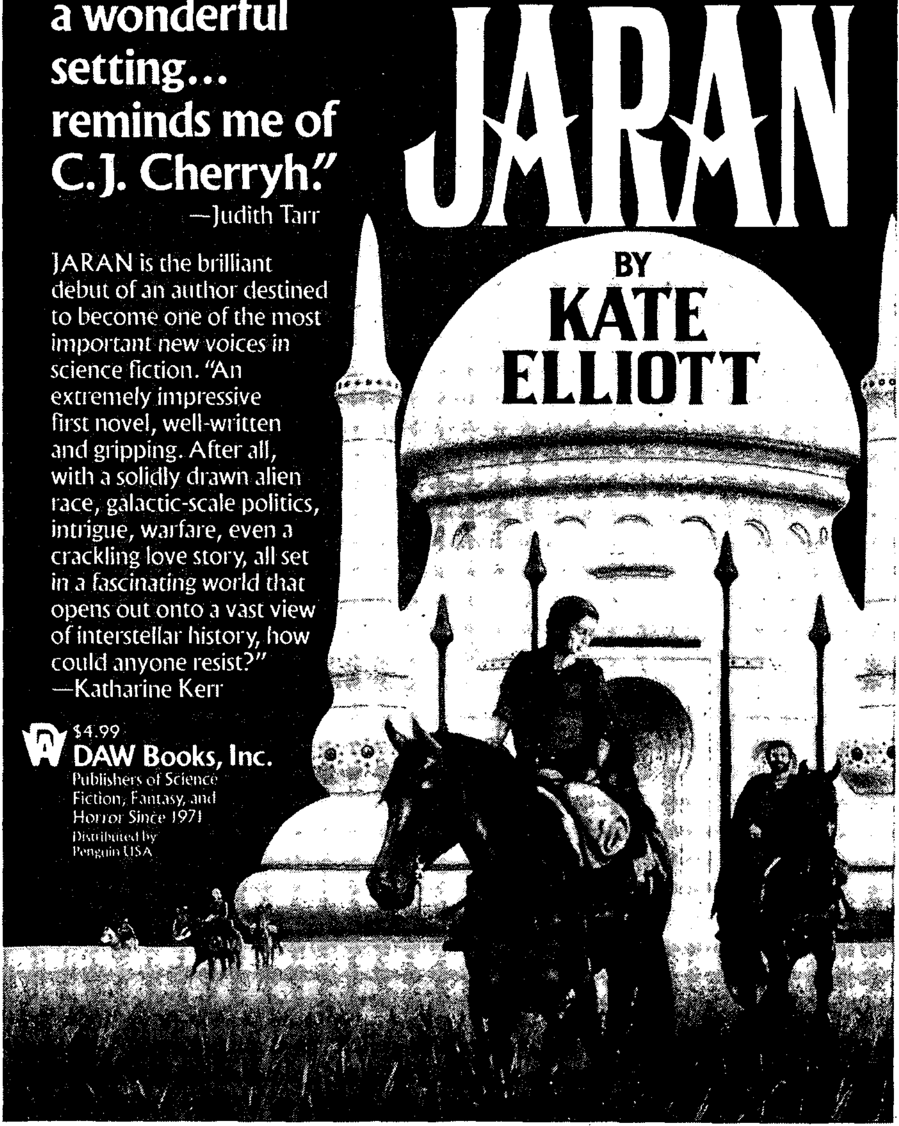
portrayed as simpletons who never did a lick of useful work and participated in demonstrations only because they got a kick out of demonstrating *per se*. Maybe there are some fair approximations of those in the real world, too—but far more important and interesting, in both fiction and reality, are the ones who are there because they are actually very concerned about a particular issue, have done some thinking about it, and think action on it is necessary.

Everybody I've ever talked to who wrote opinion pieces has become used to the occasional piece of mail from some reader who doesn't like his opinions and so tells him all about the psychological hang-ups that "obviously" cause him to hold them. Never mind that this reader doesn't know a thing about the writer personally, or that his "psychoanalysis" requires wild leaps to conclusions that are miles from the truth. It's *so* much more comforting to believe that the writer is messed up in the head than that he could actually have sound reasons for seeing things differently from the reader!

Fiction writers sometimes run into a similar problem. It happens that in my own writing, I seldom use profanity or explicit sex because I seldom need them for what I'm trying to do, and I see no advantage in turning off readers who might otherwise be interested in what I have to say. I *recommend* a similar course to other writers (unless their subject matter *requires* those elements), because nobody benefits from losing readers. However, I also recognize that, like it or not, the generally accepted standards for what subjects writers can deal with and what language they can use to write about them have changed over the last several decades. I respect the right of other writers to have different interests or priorities than I do. If I generally like a story well enough to buy it, I'm not going to tell the writer that he or she can't use this or that word, or include such-and-so kind of character, because it might offend somebody. (Editors quickly learn that virtually *everything* offends *somebody*!)

When that happens, the few offended readers often couch their complaints in such terms as, "Obviously So-and-so can't write without using @$&* and %¢?!—clearly the mark of an impoverished intellect and vocabulary." The Offended Reader may find it comforting to believe that, but the *fact* is often that So-and-so can and frequently does write without using @$&* and %¢?!, and the Offensive Story is using a *wider*, not narrower, range of vocabulary and character than the reader wants it to. Might the Offended Reader do better to consider *why* an intelligent and gifted writer is doing the things that bother him, rather than making unwarranted and incorrect assumptions about his or her abilities and character?

A good deal of straw man tilting is done across generation gaps, with neither side gaining any real advantage. The fiction problem just mentioned is one example of that, since it often involves somebody who grew up with one set of standards being uncomfortable with one that evolved later. Another common example is the venerable phe-



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nomenon of parents who grew up with one style of music dismissing a style popular with their children or grandchildren as "worthless" and its performers as "talentless." There's no reason why they should be expected to *like* the new music—that's purely a matter of taste—but it's a big jump from not liking it to calling its practitioners incompetent. As a musician myself, I have known plenty of others who worked primarily in fields I'm not personally fond of, but were quite capable of doing whatever the musical occasion required. They preferred to *use* their skills for things that didn't appeal to me, but that's an utterly different thing from not *having* the skills.

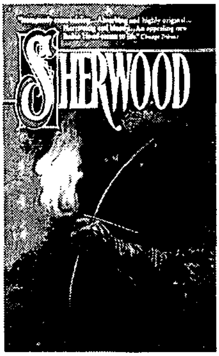
Oversimplifications and exaggerations are appropriate, even necessary, in satire. Caricatures cannot be judged by the same standards as photographs.

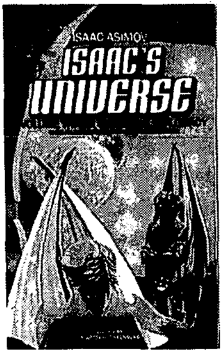
But oversimplifications and exaggerations are quite inappropriate, and counterproductive, in serious argument. Pretending your opponent is a straw man may sometimes help you get what you want in politics, but is unlikely to lead you to the solution which is actually best for a problem. There are at least two dangers that anyone tempted to use such tactics would be well advised to keep in mind. One is that if your listeners recognize that you're oversimplifying and misrepresenting your opponents' views, they may reasonably wonder what you're doing with your own.

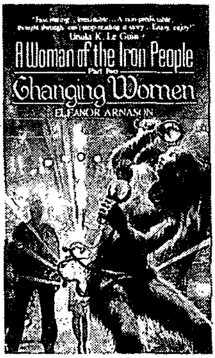
The other is that while you're sniping at the straw man you'd like to believe your opponent is, your *real* opponent may be sneaking around behind you with something important to say or do. And that, I would hope, should be disturbing to anyone, no matter which side of an argument they're on. ■

●A man is not idle because he is absorbed in thought. There is a visible labor and there is an invisible labor.

Victor Hugo







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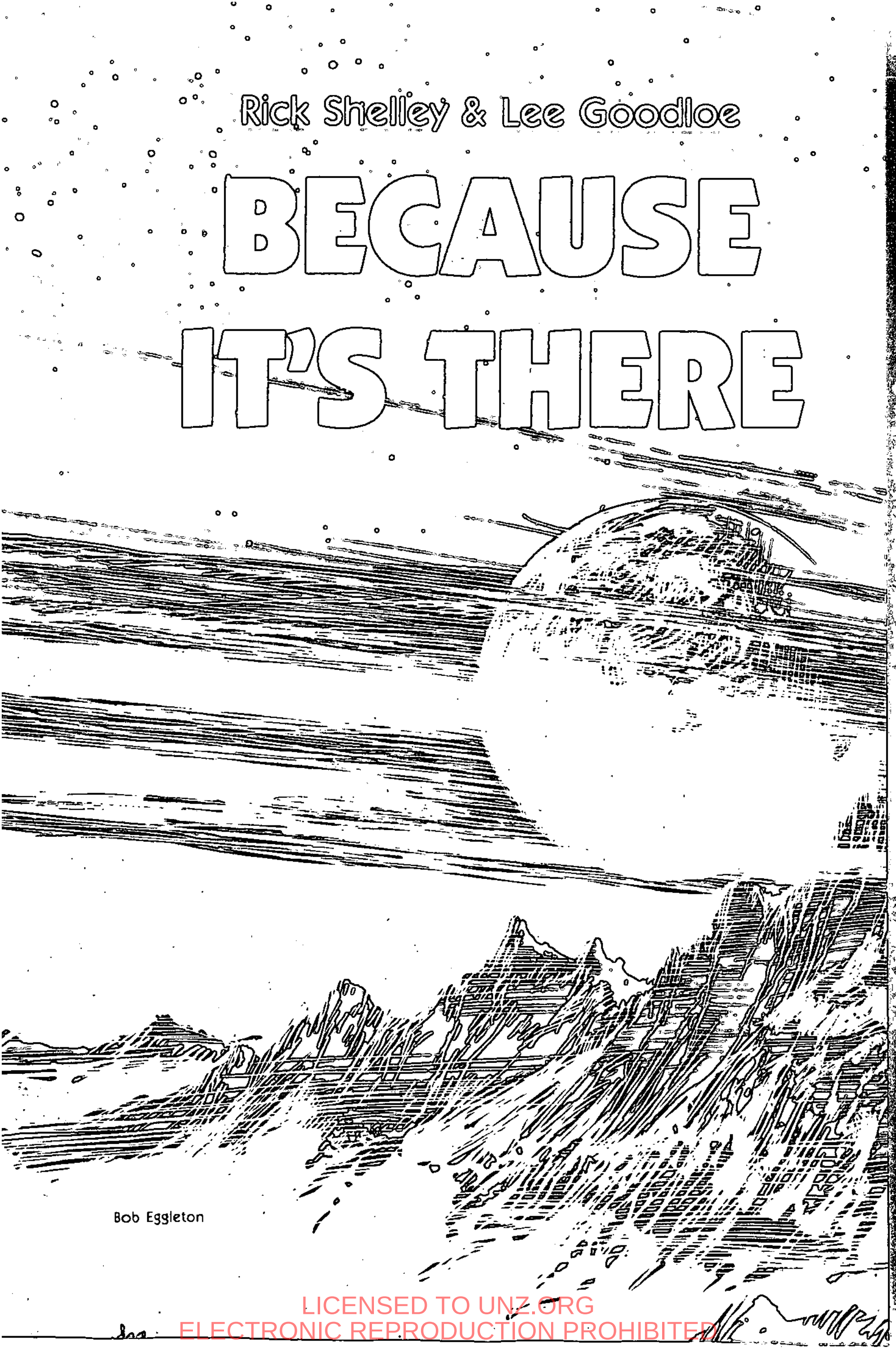

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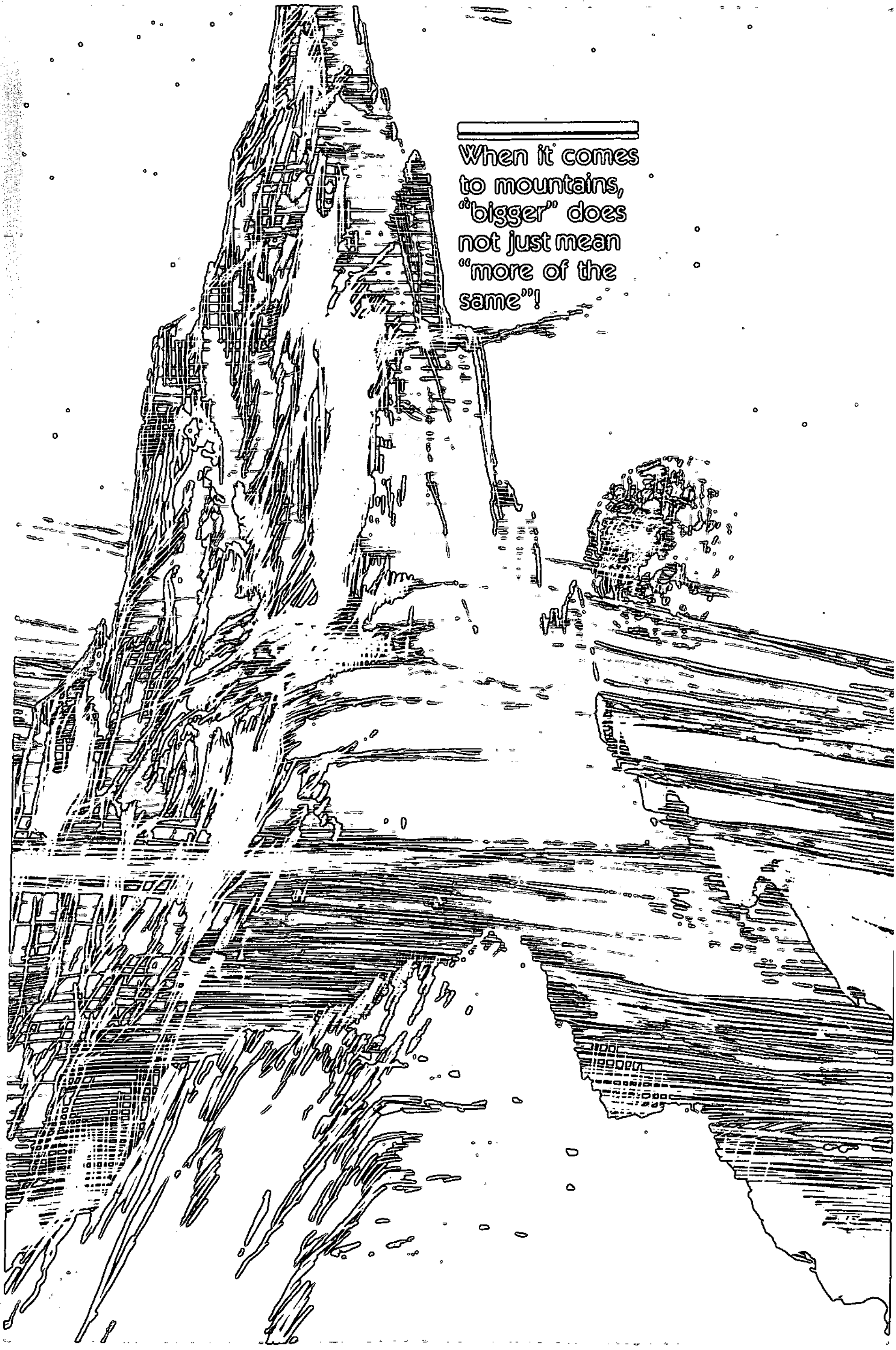


When it comes to mountains, "bigger" does not just mean "more of the same"!

1.

At 68,271 feet (20,809 meters), Mount BIT, also known as Mount B.I.T., part of the western rampart of the Tenzing Range *on the* Commonwealth *World of* Stonehaven, *is the highest mountain on any habitable world in the known portion of the Galaxy.*

Sten Magritte took a deep breath of cold, thin air. There was a scattering of snow pines off to his right on the ridge known as the Cold Shoulder. *This is what a mountain is supposed to be like,* he thought, turning through a complete circle.

"This is where I belong!" he said. He had strayed too far from the others. When the real climb started, that lack of discipline would be totally unacceptable. But today, he was in charge. Just on the other side of the Cold Shoulder, 21,100 feet above sea level, Affy, Donough, Nigel, and twelve local porters were resting after climbing the final stage to what would be the last pre-stocked base camp for the climbers.

This was the grunt work, the unglamorous prelude to a major expedition. A team couldn't carry everything it needed for a climb like this. Most of the food and special equipment had to be cached in advance. Even then, there would be a lot of up-and-down trips moving supplies higher. But this was as high as the hired hands would go. Morf Kazer, the expedition leader, had split his team into three crews to lead and help the locals, establishing the series of camps. The teams spelled each other, one starting the climb every other day—three trips a week. Once the actual climb started, the team would set up more camps, each higher than the last, caching food and equipment that would be required later. The twelve men of the team would require more than a ton of food and supplies each, at 21,100 feet, to have any chance of a few of them reaching the summit. Most of the men groused at this work.

Sten reveled in it.

His team had been three days climbing to the Cold Shoulder. They would spend the night there, then head back down in the morning. The descent would take only one day, along fixed ropes. They would rappel down pitches that had taken hours to come up. Unburdened by the gear they had carried up, the descent would feel heady. It was a time for special caution, a time when less experienced climbers might relax, might lose their concentration—and their lives.

But Sten Magritte, like all of the climbers assembled for this expedition, was a professional. When he took chances, they were always well reasoned, not careless.

Sten walked out toward the edge of the snowfield, but not too close. Then he turned and looked up the looming side of the Beast. With few cues for scale, features seemed far closer than they really were. Or maybe it was just that the mind refused to accept the enormity of Mount BIT. What looked to be flecks of snow turned out to be entire icefields; mere buttresses would themselves dwarf entire mountains elsewhere. The near-cliff of the West Face spanned over 20,000 vertical feet, not the few thousand it initially seemed. The top of Mount BIT was barren because it jutted far above the weather, to the very edge of space.

"We'll climb higher than any cloud," Sten whispered. He wouldn't let the *if you make it that far* coalesce even as a thought. No doubts. *We're going to be the first to make it to the top. I feel it in my bones.* But he wouldn't say that, not out loud. "The others are too superstitious," he continued, but the whisper was a sign of his own superstitions.

He looked down over the flank of the Cold Shoulder. This side was deeply eroded, truncated by a glacier-cut canyon. The glacier's rumpled surface, dirtied by rockfalls and framed by moraines of broken stone, looked like a scuffed-up rug from this height. He followed the ridge he was sitting on downstream with his eye, to where limestone cliffs plunged two thousand feet. More limestone bluffs jutted out below, but the layering ran in different directions. A different direction in each block? He wondered why, and then it hit him. Those tall cliffs flanking the canyon were sitting on rubble, dirt, and more tilted blocks, canted in various directions like jackstraws.

Sten had known vaguely that the Cold Shoulder was an ancient landslide off the Beast, a jumble of blocks tumbled together like aggregate for giants' concrete. But this brought it home sharply, like a kick in the stomach. The cliffs they'd struggled up today, bringing supplies to the staging area . . . all on a single fragment, itself the size of a lesser mountain—nothing more than a bit of debris shed from Mount BIT.

Morf and Jane Kazer sat alone in the small reserved dining room at the Hillary Inn. This room was the exclusive preserve of the climbing team through the duration of their stay. Affy Mack's wife, Liz, had just left, heading up to her room.

"This end is as set as it's going to get," Jane said. "The support arrangements are the best I've ever seen." Jane was an experienced climber herself, but she wouldn't be making *this* climb. Instead, she would serve as ground director, liaison between the men on the Beast and the world below. In an emergency, the skills of the person on the ground could mean the difference between life and death for the climbers. Morf would trust no one less than Jane for this expedition.

"The Beast demands the best," he said.

"It does." Jane stared at her water glass for a moment. "As long as you remember that there are limits to what even 'the best' can do. No rescue has ever been attempted above thirty-two five. There's no place to get an air pickup in above twenty-seven two. Even that is iffy."

"You could come right out and tell me to be careful," Morf said.

"Will 'careful' be enough this time?" she asked. There had been very close calculations of the risks. Both of them knew how close to the edge this climb would force everyone.

"Careful and professional," Morf suggested. "That's all we have. You've known me for twenty years, Pudding." The pet name was rarely used outside the bedroom, certainly never when anyone might overhear. "I know when to back down."

"I hope so." Jane reached across the

corner of the table and took her husband's hand. "The few times you've had to back down before, it was just to regroup and try a new route. That may not be possible on the Beast."

"No, but I have the best team in the Commonwealth, like the best team ever. And no one has ever come to Mount BIT so well-equipped."

"Just don't get stubborn at the wrong time."

"Cross my heart." Morf grinned and stood, still holding her hand. "Let's see if we can find some music."

The music. Avra Gordon-Sommers, executive director of the Hillary Inn, kept walking away from the hotel until she convinced herself that she could no longer hear the music coming from the pompously named Grand Ballroom—as if it were the largest or best of several, instead of the only.

Avra had been on the board of directors of the Hillary almost a century, ever since her family opened the hotel, and she had more than once climbed past the 21,100 foot mark on Mount BIT herself. But more and more, as she neared the end of her twelfth decade of life, she felt content to delegate day-to-day operations to her grandson, Anton Sommers.

Avra walked slowly northwest along the path to the ski terminal. This had been a bad year for skiing. The Scwinski Glacier came no lower than 11,300 feet this summer. It had been necessary to make snow for the slopes more often than she liked. Manufactured snow was a major expense.

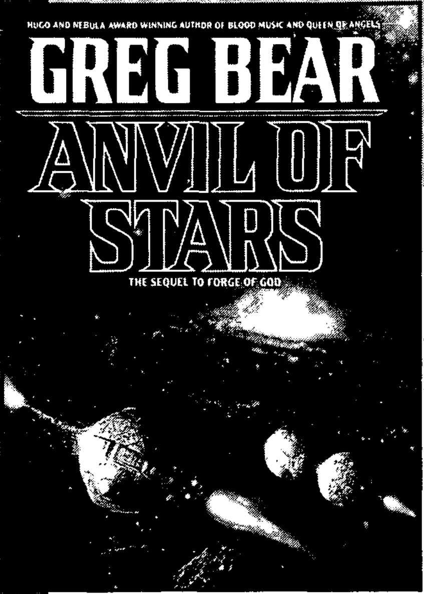
The night had brought a clear sky. Domino, the larger of Stonehaven's two moons, was nearly full, a dull ivory above the brilliant white of Mount BIT's high snow. Its light swamped any aurorae, which would be dim anyway with the lull in the solar storm. Avra looked toward the southern edge of the snowfield that abutted the Cold Shoulder, but she didn't see any camp fire or lights. The Cold Shoulder was over three miles above her, and more than nine miles away laterally. Against the competition from Domino and the snow, climbers there would have had to build a raging bonfire for Avra to see it.

But from the Cold Shoulder, the climbers would be able to see the lights of the Hillary Inn and its neighboring village, and, even more clearly, the lights from the starport. Its three corner beacons strobed into the heavens, bright enough to be seen a thousand miles out. Avra had been on the Shoulder. She knew what the climbers could see.

"What is it about people?" she asked the night. "Why are we so drawn by high mountains?" She knew the quote on the replica of the Beast that stood in front of the hotel, the quote that had given the mountain its acronymic name. "Because it's there." It had never seemed sufficient, never seemed to explain anything at all. And the ninety-seven names carved below that legend—all the climbers killed on Mount BIT—didn't make it meaningful.

She had a husband, and a grandson, among those ninety-seven names.

The Kazer team was the first major climb to attempt Mount BIT since before the start of the war between the Commonwealth and the Federation. Not a year had passed that there weren't at least local assaults on the Beast, but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A QUESTAR HARDCOVER

those teams had been content to aim for lesser goals than the summit or "higher than anyone else." Even so, two climbers had died during the war years.

"How many will this team lose?" Morf Kazer and his people were the best climbers to assay the Beast in more than a decade. Avra didn't have the slightest doubt that death would attend their efforts.

The rituals must be observed, Morf reminded himself. He stopped, ducking slightly, to clear the doorway leading into the main dining salon of the Hillary. Over seven feet tall, he had spent most of his adult life trying to protect his head from passages designed for shorter people. Although it was an hour before dawn, the dining room was crowded. This was the day that "The Climb" would begin, even though the team had been on Mount BIT for more than three weeks setting up their base camps and stockpiling supplies. Today, "The Climb" started in earnest though, and the rituals of the Hillary Inn decreed a public breakfast and send-off for the climbers.

Morf gave the room a scarcely detectable nod and moved in. Jane was at his elbow. The rest of the team followed. Two tables had been set aside in the large alcove near the kitchen for Morf and his companions, and for Avra and Anton, as representatives of the hotel. Four tables in front of them were for the local climbers who had been employed as porters and guides during the preliminary stages, and who would form the core of any rescue effort that might have to be mounted. The rest of the dining room was given over to other hotel guests and to local residents who had come for "this" spectacle.

"Parade us past the gawkers," Affy Mack had grumbled when Morf told the team about the breakfast.

"Ease off," Sten had told him. "Got to have the goodwill of these folks. They want their little ceremony, what does it hurt, heh? We're the celebrities, the stars. Their ceremony, our show."

"They get more send-offs than triumphal returns." Morf had injected the serious note to keep his people from getting carried away over this minor distraction. "Up to us to change the tone, right?"

Morf wasn't completely thrilled with the spectacle himself, but he didn't let it show. The ordeal was minor enough. There would be no long speeches or individual stand-up-and-take-a-bow introductions. Many of the hotel guests knew who each of the climbers were. And all of the locals who had helped or who would be part of any rescue team knew them. Morf had been careful to make certain of that. *If we need rescuing, we'll need the best effort these people can make. And they'll try harder for people they know, people they've talked with, worked with, drunk with*. It was the kind of cold calculation that a climb leader had to do, and do well.

But then, he was a professional; they were all professionals.

It was just past sunrise when the climbers trooped out of the dining room, through the lobby and out the hotel's main entrance. Tucked in its high valley, the Hillary Inn was still deep within the shadow of Mount BIT, and would be for several hours yet. Most of the guests and locals who had been in the dining room came out with the Kazer team. The climbers boarded a series of armored personnel carriers, tracked vehicles that would carry them up the glacial valley to the point where they would actually begin their climb, ten miles from the hotel.

The ride was noisy and uncomfortable. Talk was impossible inside the carriers. Thought was difficult. The climbers sat on benches facing each other, crowded too close together. But it was a practical method of getting up the valley without expending energy that would be needed later.

Morf rested his arms on his thighs and leaned forward, his gaze directed at the floor. He tried to keep his mind a blank, resting against the work to come. It was time to put the stresses of planning behind, to ready mind and body for the different stresses of the climb. So much done. So much to do. There was no room for fear now. On the mountain, in a bad moment? There might be fear, but it would be a controlled, productive fear, an adrenaline high, almost a thrill, that would not preclude rational thought and action. Those moments were ones to be savored. Victory—survival—snatched from the grasping claws of defeat and death.

I'm addicted to it, Morf conceded. *I couldn't live without it.*

Almost as soon as the first vehicle started away from the hotel, Anton Sommers went back inside. At that, he wasn't the first to quit the gathering out front. Jane Kazer and Liz Mack had gone back in as soon as their husbands boarded the lead vehicle. Their farewells had been subdued, not at all emotional. Anton had watched as closely as he could without being obvious. *What do these women think?* he had asked himself. *They know there's a significant chance they won't see their husbands again. How can they cope with that when the risk is unnecessary?* Anton shook his head as he crossed the lobby on the way to his office. He would never understand.

He still had a hotel to run. There were the inescapable daily chores, climb or no climb—reports from department supervisors, purchase orders to approve, plus anything else that might come up. Routine work was the best way he knew to take his mind off the imponderables.

The tremor caught Anton lost in thought and off-balance. He felt a hot, stabbing pain in his left ankle as it twisted under him. His shoulder and head smashed into the wall before he fell to the floor, dazed but still conscious. Dizzily, he tried to get up to his hands and knees, but when he put weight on his left foot, the ankle shot another fire-tipped arrow of agony up his leg.

Fractured, sprained at least, Anton thought, giving up his attempts to stand. As soon as the quake ended, there would be help. *Have the climbers had time to reach the head of the valley?* he asked himself. He decided that they hadn't. *Will they have an avalanche?* The answer to that would have to wait until the shaking ended . . . and why was it lasting so long? *This is impossible*, Anton thought, but then the tremor stopped. No more than thirty seconds had passed since the start.

"Dad! Are you all right?" Stephen Sommers's voice rose and threatened to crack. He was in his late teens. Anton opened his eyes, unaware that he had shut them until he heard his son speak.

"My left ankle is sprained, perhaps fractured," he said, startled at how tight his voice sounded. "Report." Not for the first time, he mentally cursed Stonehaven's 1.21 standard gee. Even a short fall under high gravity could cause serious injury.

"Let me get a chair first." Stephen was gone, running down the hall, before Anton could insist.

"Dammit," Anton muttered through clenched teeth. "Don't worry about me. What about the guests, the climbers?" Anton drew in a breath and held it against the pain.

"Hurry up. Let's get him to the infirmary." Stephen's voice was audible before he came back in sight.

"What's happened?" Anton demanded as the porters lifted him into the wheelchair. With Anton's bulk, it was a considerable effort for two.

"It's too soon to tell," Stephen said. "No obvious structural damage here. This couldn't have been more than a six. But the switchboard is going wild. We're making contact with the APCs now."

"How long until we get new satellite exposures of the Beast?" Anton demanded as one of the porters started to wheel him toward the hotel's medical department.

"I don't know," Stephen said. "It hasn't been two minutes since the quake ended."

Anton half-turned in the chair and said, "Take me to Mrs. Kazer."

"No!" Stephen said, his voice rising. The porter kept going toward the medical office. "First off, we take care of casualties, as always."

Anton smiled, amused in spite of the pain. Stephen liked being in charge, for a change. And Anton wasn't the first to reach the surgery. Two guests with minor scrapes were ahead of him. Anton signaled for the doctor to finish with them. Stephen had already left, after telling the doctor and the porter to make sure that his father remained until he had been treated.

The climbers missed the beginning of the quake. The shaking of the ground was masked by the movement of the vehicles. But the drivers could see, and they moved their vehicles to the center of the glacial valley and stopped, each driver leaving himself room to move in a hurry if he spotted rock fall or a crack in the ground. And then their passengers could feel the tremor.

"Do we stay in here or get out?" Morf asked his driver.

"Safer to stay inside," the driver said. "It'll . . . there, over already."

"That was a strong one, wasn't it?" Morf asked, trying to remain calm.

"Moderate, only moderate," the driver said. "Probably didn't do any more than break a few teacups."

"I need to check with my wife at the hotel."

The driver shook his head. "Might as well wait a few minutes. They'll need time to sort things out. We might as well drive on to the head of the valley, see if there's any trouble there."

Morf hesitated for only a second before he nodded. "Let's go then." He leaned back in his seat and took a deep breath. *I hope we don't hit anything like*

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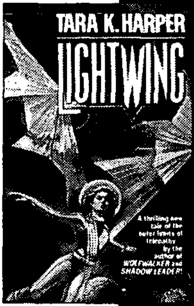
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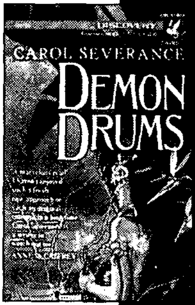
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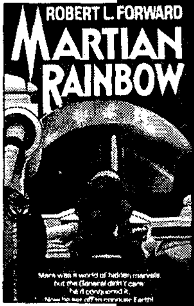
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that up on the mountain, he thought. They'd known about the region's seismic activity, but it hadn't figured prominently in the team's planning. "How common can earthquakes be?" someone had asked. "It'll be a fluke if we feel one at all while we're on the mountain. It'd be even more of a long shot to hit one during a really bad pitch."

Flukes, long shots. One thing or another had kept other teams from reaching the top of the Beast. One thing or another had killed ninety-seven climbers.

There had been some minor rock fall at the head of the valley, some dirt sifted through the scree. A few clean rock edges had been turned to the open air. One tree trunk had been splintered by rocks moving at lethal speed under the high gravity. Morf and his companions walked around the area. After a minute, Morf pulled out his pocket talker and called his wife. Down this low, the static from the solar storm wasn't bad.

"Anything we should know about?" Morf asked as soon as he had assured Jane that none of the climbers had been affected by the quake.

"It may be hours before we know if there's been any disturbance to the route up the mountain," Jane replied. "We'll have to wait through two satellite passes and the time it takes to process the images."

"That's no good," Morf said. "Either we go now, on schedule, or wait for tomorrow. And I'd rather take advantage of weather we know is good."

"The director can't tell me if this was the major shock that the earlier tremors have been leading up to, or if this is just another foreshock with something worse to come."

"Does he have a guess?"

"Not that he'll admit to," Jane said. "He made it clear that it could go either way."

Morf had another thought. "While we're at it, what's the status of the sun?"

"No change. Solar activity is still strong, but there's been no flare warning."

Morf took a breath. "OK, we go today. Let me know if there's anything in the pictures. We can always scrub later if we have to."

"I've already told the director that you'll be going on. He said he expected that." Then her voice softened. "Be careful, Morf. We've never tackled a mountain that wasn't willing to sit still for it."

After she finished talking with Morf, Jane turned to Liz, who was standing across the room by the window that looked out toward Mount BIT. "They're going," Jane said unnecessarily.

Liz nodded. "They'd have gone in any case, unless the top half of the mountain had slid off."

"Maybe even then," Jane said. "The first climbers to do both halves of the Beast in one season. I can see Morf coming up with an idea like that."

Liz smiled thinly. There had been one story circulating in the hotel that they had all laughed over. It was improbable, but the sort of tale no one could quite put out of mind. Some visiting geologist, twenty years earlier, had suggested that a major earthquake might finish the job that had formed the Cold Shoulder;

for the top of Mount BIT to fail catastrophically, sliding away and shattering like glass dropped on plascrete. In the next hundred thousand years or so. . . .

Talk about your bad omens, had been Keener Sofit's initial reaction to the earthquake, but he kept that to himself. When the team got out of the vehicles at the head of the valley, he walked over to the tree that had been split. If a rock like that hit one of us, all the protective gear in the galaxy wouldn't help, he thought. He was still shaking his head at the tree when Morf yelled for them to get their packs on.

"Yeah, let's get started," Keener said. "The Beast isn't going to sit there forever waiting for us." That brought a few groans and scowls from his colleagues. *Give yourself a gold star*, Keener told himself.

There were no particularly dangerous pitches in the first morning's climb. Even if there hadn't been fixed ropes in place, any of the climbers in Morf's team could have free climbed the stretch without difficulty. But Morf had ordered his team linked into their three climbing ropes anyway. Partly, that was to get them into the habit of using the ropes, but it was also a reaction to the morning's quake—and to Stonehaven's gravity. If a strong tremor caught them on even a gentle slope, it might send one, or all, of them tumbling. Where the angle of the slope increased, or where they were near an abrupt drop, the team moved with even more care, two men belaying each four-man line while the other two moved, then reversing their roles. There were no complaints from any of Morf's people, though a few of the local climbers who were helping to haul supplies showed their impatience.

At noon, when Morf called for a lunch break, the team had only climbed 2,500 feet, but they had lifted quite a stock of supplies that same distance. They had another long, mild pitch ahead of them, a slope rarely steeper than 35 degrees, covered with dwarf fir trees. There would be no chance to use ropes to haul supplies up that pitch. Everything would have to be carried on backs, two treks up each section.

"I don't see why we don't move *everything* up in advance," Keener said after he finished his lunch. "Then we'd just have ourselves to worry about." He knew the reason, but Affy repeated it anyway.

"Part of the conditioning. We came up the start with nothing, it'd be that much harder to carry the stuff later on, above the last base camp."

Yes, but we'd have husbanded that much extra energy, Keener thought. He had never been completely convinced that the balance actually tipped in favor of the standard procedure.

Morf took off his safety helmet long enough to pull the top of his climbing skins free of his head. He was sweating from the morning's work. C-skins were among the newest technologies adapted for mountaineering, in this case directly from leotard space suits, themselves a late development in the recent war with the Federation. Nigel Carline, their expert on airless climbing, had briefed them on the skins and had overseen their training. He was the only one who was used to doing a climb so isolated from his environment.

With the addition of a sealed face mask, climbing skins were as close as anyone could get to an organic, self-contained, closed, extended wear personal survival suit. A set of c-skins resembled a diver's wet suit, but it was much more. A layer of synthetic microbes sandwiched between two organic insulating skins helped regulate temperature for the wearer and recycled breathing air and wastes. C-skins also provided skin support at low atmospheric pressures, even to vacuum—though at that point the microbes would start to die. That support was essential. Without it, blood would boil around 55,000 feet on Mount BIT, and hematomas, mucous-membrane bleeding, and other injuries would start to show up at even lower levels.

The organisms within the skins needed time to adapt to increased altitude and reduced oxygen, just as people did. Their efficiency, in everything, decreased as the demands on them increased, called for additional methods for combating the environmental hazards of climbing.

Sheer energy requirements made it impossible for the bugs to recycle any more than a fraction of the air required. A person actively climbing in cold weather needs around five pounds of oxygen a day. So they also had reverse-osmosis face masks, powered by photosynthetic microbes that pulled oxygen from the thin air outside to maintain pressure at a breathable level. The face masks also had individual radios. The thinner the air, the less efficiently it could transmit sound. At the top of Mount BIT, the climbers might as well shout in vacuum for all the good it would do them without radios.

If, of course, they got high enough for that to matter.

"Let's move," Morf said, exactly forty-five minutes after calling the lunch break. "We need to get in another two thousand feet before we kip down for the night." He pulled the top of his c-skins into place and secured the chin strap of his helmet. *We've got a long way to go before we're up where we belong*, he thought. When he looked up the side of the mountain, it was with uncontrollable lust.

2.

Mount BIT is a mountain on a mountain. The Tenzing Range, like the highest mountain ranges of all ocean worlds, lies along a collision zone between two continents. Stonehaven, an active planet anyway, is in the middle of a pulse of vigorous seafloor spreading, so the crushed sedimentary rock at the collision has been stacked together much more thickly than usual. The collision has also sutured together most of Stonehaven's land area into a supercontinent, and supercontinents are unstable. They act like huge insulating blankets. As heat builds up below, rock expands, lifts, and a blister of crust rises. Mount BIT rides atop that blister. Its main ridge is a massive block of sedimentary rock tilted almost on end, hoisted precariously into the sky. Major parts of the mountain have collapsed catastrophically as weak shaley strata have failed and acted like great sheets of lubricant along which gigatons of rock roared downward. Ancient landslides splay out around the mountain's

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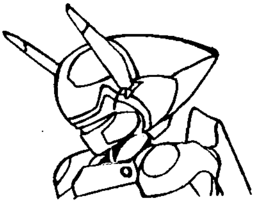

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base. The West Face itself is a dip surface, sheared off by a gigantic collapse. Oversteepened, uncompensated, subject to intense erosion, Mount BIT is a ephemeral anomaly. In another hundred thousand years or so, it will be gone.

On the third night, the climbers slept at 17,500 feet, at the next to last of the pre-established camps. The air had already thinned out enough, under Stonehaven's high gravity, that all of the off-worlders slept with their face masks on to supplement the air reclaimed by their climbing skins. The Stonehaveners all made do with just c-skins.

The next morning, the climbers moved loads up to the last established camp, at 21,100 feet. After lunch, the twelve members of the Kazer team started up with the last loads. The local climbers started down off BIT.

"Now it's just us, the way it ought to be," Keener said after the last of the local climbers had made it down the first stretch of fixed rope from the camp at 17,500 feet.

"And tomorrow they'll be home with their wives and children around them, spending the night in their own beds," Sten said. Although the air was still thick enough that the face masks didn't keep them from hearing each other talk, they had turned on their radios anyway, at Nigel's suggestion. "Might as well get used to them," he'd said. The ionospheric static from the solar activity was initially annoying, but faded rapidly from conscious awareness.

Morf put away his pocket talker. He had reported the departure of the local climbers to Jane. They were in frequent contact throughout the day. Jane and Liz spelled each other down in the hotel, but one or the other was always there to take any call.

"Sten, you take your rope up first," Morf said. "I'll follow. Affy, you've got rearguard."

One way or another, Mount BIT was always the focus for the Hillary Inn, even when there was no major climb. Even before the war there had been years without an all-out assault on the Beast, and in the best of seasons there were rarely more than two major climbs like the Kazer expedition. Those were always made by off-world teams, even though Stonehaven could boast its share of championship-class mountaineers. Several teams had included Stonehaveners. But even without the occasional major climbs, Mount BIT was the *raison d'être* for the Hillary—and for the villages around it. Teams of local climbers explored new routes up the lower flanks of the mountain. There were backpacking trails that non-climbing visitors could enjoy, "nature treks" into the valleys around Mount BIT and on its lower reaches. There was year-round skiing. And there were academic endeavors as well. Mount BIT and its neighboring peaks in the Tenzings drew geologists by the score as well as lesser numbers of biologists. And there were the inevitable, if naive, seekers after gold and gems.

But a major climb drew everyone's attention. The north wall of the hotel's main lobby was the focus of an eight-foot high holographic projection of Mount BIT that could be rotated to keep any route in sight. A copy of the holo was maintained in each of the hotel's public rooms, and any guest could punch up a duplicate on any guest room monitor. The computer projection marked the route the climbers were taking, the position of the team, and the routes that previous climbs had taken, for comparison. The projection was kept as up-to-the-minute as possible.

"Our people have started back down," a bartender in the Alpine Lounge told a local customer as the projection at the end of the bar changed. A blue arrow had reversed, aiming down instead of up. Blue indicated the local climbers who had been assisting the Kazer team. The off-worlders were marked by red.

"No mishaps so far?" the customer asked, turning to look at the holo.

"Not a scratch," the barman said, as proudly as if he were personally responsible for that accomplishment.

"How many of the strangers d'yer figure will make it off the Beast alive?" the customer asked, turning his attention to his mug of ale.

"With luck, all of them," the bartender said. He knew better than to speculate on how many climbers might be killed or injured. That was a certain way to lose a job at the Hillary Inn.

"I hear this batch's better equipped than any we've had before."

"That's the honest truth," the barman said. "The best of everything, and plenty of it." If you have to say anything about climbers, make it positive, went the briefing that Mrs. Gordon-Sommers herself had given the staff the day before the Kazer team arrived. Positive, optimistic, hopeful: we're here to serve, to make our guests happy, not to frighten them or to excite those who get their thrills from the tragedies of others.

"You don't really believe they'll reach the top, do you?" the customer asked. He drained his mug and stared at the barman over its rim.

"It's never been done before. Whether this group'll be the one or not, I can't say. It'd be nice to be able to tell my grandchildren I was here when the job was done." It would indeed, the barman thought, though he didn't believe that anyone would ever do it.

The entire east wall of Avra Gordon-Sommers's bedroom was one-way glass. Avra sat in her most comfortable body chair by the window. She had finished her lunch and retreated to the bedroom—not to sleep, but to sit and stare at Mount BIT. The West Face brooded, 20,000 feet of dark blank rock, not catching the light nearly as well as did the snowy slopes below.

I've met every climber who died trying to conquer that mountain, she thought. After so many years, she didn't really remember all of them. Even looking through the photographs in the hotel archives didn't always bring back any sort of personal memory. But she *had* met them all, shook their hands, wished them well, drunk toasts to their success.

Almost a century of it, was a depressing thought.

Avra sipped at a fruit drink, barely tasting it. *Maybe we should get out of the business of catering death like this.* It wouldn't even take a planetary government ban of the major climbing expeditions that suffered most of the deaths. It would only be necessary for the Hillary lun to get out of the business of providing its services for those climbs. Perhaps they wouldn't end altogether, but there would be fewer of them.

"But we won't." Talking to herself never gave Avra any discomfort. She had been doing it all of her life. She took a long sip of her drink and considered adding a little gin to it. That brought a smile to her face. She rarely touched alcohol anymore. Most of the pleasure had gone out of that when she was in her forties, an eternity ago. She now drank only on rare social occasions—or as a carefully monitored moment of escape, never too often, never too protracted.

I ration even my vices, she thought. She got up and carried her glass into the next room, where she kept a bar stocked for entertaining. She poured a careful measure of gin into the glass, added another ice cube, and a little more juice. Near-lime was how she thought of the native juice. It wasn't citrus, but it was as close as Stonehaven could come, and the taste wasn't that different from lime.

She stood at the bar and took a cautious sip of the revitalized drink, then nodded. *Perfect*. Then she took the drink back to the bedroom, to sit and stare out at Mount BIT a little longer.

Finally, Morf thought as he set his first chock above the base camp at 21,100 feet and tugged on it experimentally. *We're really underway, at last.* It was always hard to think of the preliminary work as true climbing, though it was absolutely essential. But *this* was what it was really about. He had his four-man rope on a rock face, opening a route. They would climb until they found a safe place where they could move the entire team and most of their supplies. Establishing the route would be enough for this afternoon. Once he found a suitable spot for that next cache, Morf and his three companions would rappel back down to the camp at twenty-one one on the Cold Shoulder to spend the night.

Morf clipped a carabiner on the chock's rope loop and threaded the team rope through the D-ring. He whistled softly while he worked. Sten's line had opened the first 500 feet. Then Morf's section had moved up to take over. They had covered another 300 feet so far. It had been fairly easy going. This face had been climbed before, many times. There were a few fixed pitons, left by previous parties. There were footholds and handholds. Only the altitude made this face difficult. Only . . .

A few small rocks bounced off the slope to Morf's left, accelerating fast in the high gravity. Instinct and experience took over. He shouted, "Rocks!" then pressed himself against the face, hunching his shoulders up toward his helmet. It was only then that he realized that the mountain was trembling against him.

"Quake!" Morf shouted. He grabbed the rope on both sides of the carabiner, just below the last chock. His other hand massaged the tiny ledge he was using for a handhold, trying to make the grip a little firmer. His feet were as secure as they could get. By that time, the trembling had stopped.

If I hadn't been pressed against the rock, I might never have felt it. Morf realized. A minor tremor. Nothing at all.

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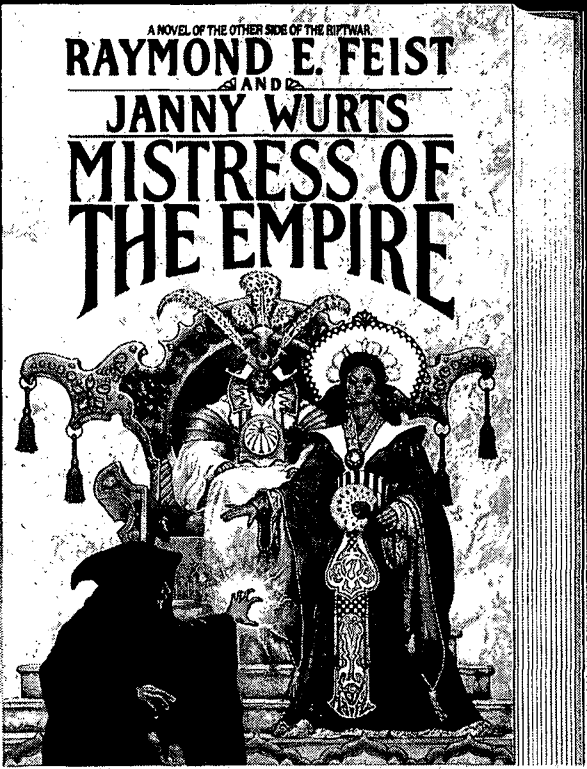
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"All clear down here," Keener called from the end of the rope. "Nobody hit below either."

"Good," Morf said. "Let's get moving. I'll feel better when we've got a little more room for our feet."

There was one more barely felt tremor before they reached a ledge wide enough to serve as a refuge.

Nigel Carline had known it was a gamble when he first proposed it to Morf, but it was a calculated gamble—and anything they did on Mount BIT came with a full serving of risk. In any event, the standard approaches hadn't worked. *Something* new was needed.

"We should push for the Weatherline," he had argued. "Set up a forward camp there. Bring everything and everybody through the weather zone as fast as possible."

It sounded preposterous at first. Morf had almost dismissed it out of hand. Few parties had made it to the Weatherline at all, and none had set up extensive camps there. But many parties had been pinned down for days, unable to move because of violent weather on the Beast's lower reaches, and not a few had frozen to death, or been electrocuted by lightning.

"The rock above the Weatherline has to be sounder. It won't be shattered by frost riving. We won't have rotten snow and ice to contend with. The wind won't be a problem in that thin air, even at hurricane force. *And* we won't chill as fast." Nigel ticked off his points on his fingers.

Morf had resisted. "That's crazy. Suppose there's a solar flare? We need to minimize our time in the thin atmosphere."

"There's a lot of rock up there," Nigel said. "We shouldn't have trouble finding shelter. And solar flares don't last nearly as long as Stonehaven storms."

"But the climbing skins," Morf continued. "We'd have to live in the skins much longer, with much worse consequences if they fail. We have enough problems with life support without taking on more of that than we have to."

"In the pressure tents we can take our masks off. That's the only place we'll need to, to eat solid food. There's no other problem with wearing skins indefinitely." Nigel paused. "You're thinking like a wetworlder, Morf. You're scared of vacuum simply because it's vacuum. But the cold, soggy air you're used to dealing with is a hell of a lot more dangerous. Vacuum doesn't reach out and grab you like weather does."

Nigel was their expert on airless worlds, a veteran of climbs on Ares, Set, and many others. Morf was finally convinced. Maybe this would be the new approach, the critical innovation that would let them succeed where so many others had failed.

"Day 14," Jane Kazer announced. She kept her eyes on the script in front of her. That was easier than looking at the camera. The report was being broadcast live around Stonehaven. Twice a day, either Jane or Liz provided updates. Recorded bubbles were sent offplanet whenever a ship left for anywhere. The reports had become more of a chore for the women with each passing day.

"Ten days after leaving the last pre-established camp, the team has reached 36,200 feet. Only three other climbs are known to have reached that altitude, though a fourth may have." Jane shared the screens and view tanks with the projections of Mount BIT. A pointer, manipulated by a technician in another part of the hotel, highlighted her talk.

"This afternoon, at 3:07 local time, a five point one earthquake was recorded. Although the temblor was quite apparent here at the Hillary Inn, the climbers reported that they weren't aware of it." The quake had lasted nearly thirty seconds, the strongest since the start of the ascent. It seemed incredible to Jane that the climbers hadn't even felt it.

"The weather remains favorable, as it has throughout the climb. There are no significant prospects for the thunderstorms that could make this stage of the climb especially hazardous." An electrical storm that high would be fierce. Even without all the metal the climbers carried, avoiding lightning would be difficult.

"In another few thousand feet, the weather will no longer matter. The team will cross the Weatherline, where they hope to establish their last advance camp for the final assault on Mount BIT." If the team kept going, they would get above the weather long before they neared the summit. At the top, there would be only the near-vacuum—and the possibility of a solar flare. Jane wished that the sun's weather was as good as that on the Beast.

The ten minutes of the report seemed like ten hours to Jane, but it was finally over. The red light went off above the camera lens and Anton Sommers walked around in front of the camera.

"No technical problems," he reported. Three days before, a glitch in the control room had made it necessary to repeat the report.

"Good." Jane got up, took a deep breath, and let it out. "Now, as soon as I can get some food to stay down, I'm going to bed. I'm exhausted." Jane and Liz split the "duty." During the daylight climbing hours, they were generally both in or near the office that had been set up in the third floor suite. Once the climbers settled in for the evening and the broadcast was over, they divided up the night, taking turns sleeping and listening for any calls.

What I wouldn't give for a drink, Jane thought as she hurried from the room, but alcohol was the one thing she wouldn't take, not with her husband and all of the others high on Mount BIT, where any second might bring an emergency.

Cold. Morf couldn't get the word out of his mind. Even with his climbing skins on, and insulating coveralls atop them, he was cold. The microbes in the c-skins were always a day behind on their adaptation. *We'd have to cut our rate of climb in half for them to be fully effective*, Morf told himself. But that would double the time they would need to make the ascent, and they could hardly stockpile enough supplies to support that.

Morf had a plastic bubble inflated over his head and the top half of his body. So high on the mountain, the bubbles or their pressure tents were the only way the climbers dared to take off their face masks to eat solid food. Water and soup could be taken through tubes fitted into the masks, but not solid food—and the physical exertion of climbing at altitude demanded solid food. So the climbers carried these bubbles, and inflated them for supper and breakfast. The last two nights, most of the climbers had also slept in the bubbles, only partially inflated so they would fit in their sleeping bags, using the extra layer of oxygen as additional insulation to keep off the wind and cold. It helped, or seemed to. *Anything that keeps us moving is worth it,* Morf thought.

He had already finished his supper. The others were checking their moorings, getting ready to sleep. Eat, then sleep . . . and eat again when you wake.

If I should die before I wake, flashed through Morf's head and was gone before he could stop it. It was possible. This high, it wouldn't take much, even without a climbing accident. If someone's c-skins failed during the night, he would probably never wake. During the day, a suit failure might give some incremental warning, and there were spare c-skins, two per man. There might be time to pressurize a tent and let a man change into fresh skins. Might.

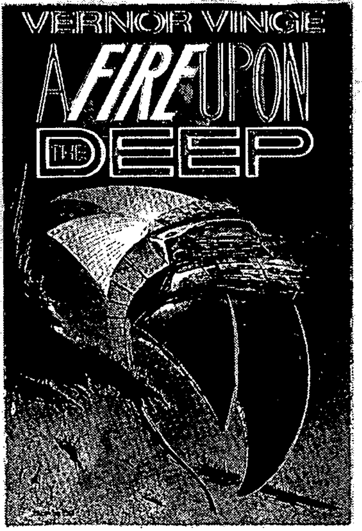
Morf checked his own anchors. In places, there was less than three feet from rock face to the lip of the ledge. There hadn't been room to set up tents on this bivouac. Sten had his sleeping bag arranged to let him sleep sitting up, back against the rock, feet nearly hanging off the ledge. Morf's sleeping bag was crossed by two ropes, each secured to carabiners attached to a pair of pins. The head of his bag had a reinforced loop. When he lay back to sleep, he would tighten the rope that led from the loop to a deep bolt that he shared with Keener Sofit and Derrow Jacobs, two of the men of his rope. Ian Wilkes, the fourth man on the line, shared an anchor with two of the people in Affy's squad.

Finally satisfied, Morf slid his hand out from under his air bubble to tighten the ropes as he lay back, knotting them securely. Then he sealed the lip of the bubble to his clothing again, put his face mask back on, and closed his eyes. Sleep came immediately.

The Hillary Inn quieted down for the night early. Avra made a leisurely tour of the public rooms, as she did nearly every evening. The dining room was empty. Anyone who wanted food now would have to settle for room service, fast food in the snack bar, or go down to the village inn. The casino was barely doing enough business to meet overhead. The recreation rooms were virtually deserted. There were a few drinkers left in the bars, guests and locals. Avra knew most of the locals by name, and she made a point of knowing the hotel's guests, though most of them would be forgotten as soon as they checked out.

"About as we expected," Avra mumbled as she headed toward the reception salon. Stephen was breaking in as night manager. He was busy, working at something on his monitor, when Avra walked up.

"When your father calls down in the morning," she told him, "tell him that I want someone from senior staff with the women from the Kazer team at all times during the day, from now until the climb ends. Until they get back down to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A FIRE UPON THE DEEP

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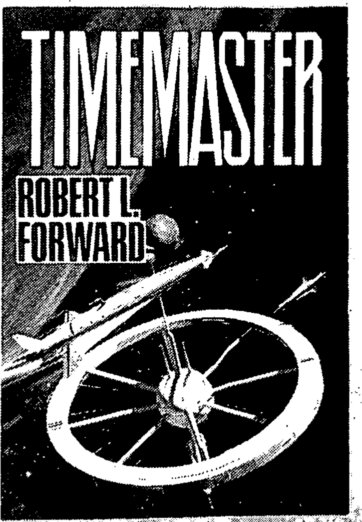


TOR BOOKS

more to the right. There's a chimney that starts somewhere along that side of the buttress, shouldn't be far above us now. We need to leave Leroux's route somewhere along here.''

''Be nice to have a cozy chimney to shoot up,'' Sten said. ''Get us out of the wind.''

''How clear are you on where that chimney is?'' Nigel asked, turning to Morf. Nigel recalled seeing the chimney on the maps they had studied, but the details weren't as clear in his memory as he would have liked. They had looked at several possible routes about 40,000 feet. Nigel didn't want to make a decision based on garbled memory, and his rope was due to work the next pitch.

''Between six and eight hundred feet above us,'' Morf said. ''I had Jane doublecheck it.''

''It might give us an easier time later,'' Nigel said. He forced a grin. ''Sure. It will feel good to get above this damned ice. Start the real climb.'' With an effort, he cracked his trademark one-liner.

Jane let out an audible sigh of relief when Anton left the office. ''I thought he'd never leave.''

''You know what's going on,'' Liz said. ''They don't want us frail women to be alone if something happens. He might as well wear a sign.''

The climbers were well into their lunch break. Both women had talked to their husbands. Then Anton had suggested sending out for lunch. Jane and Liz had both declined, saying they would eat later, and finally convinced Anton to go down to the dining room for his own meal.

''I won't be long,'' Anton had promised. The climbers were taking a break. They would be safe for a time, he reasoned. He would be back before they started again.

But he wasn't. Anton had scarcely had time to reach the dining room before Morf called down to say that Nigel's section was starting up the next section of the buttress, and that they had decided to cross to the chimney on the other side.

After a time, Jane stood and stretched. She was used to a much more active lifestyle, but since the ascent had started, she had rarely done anything more strenuous than walk from one room to the next. Exhaustion was still becoming a constant companion.

''I need to get outside and run for about ten miles,'' she said.

''So go ahead,'' Liz told her.

Jane shook her head. ''Fresh air would probably put me to sleep. I'm going to need weeks to get back in shape.''

Anton returned before Liz could say anything more.

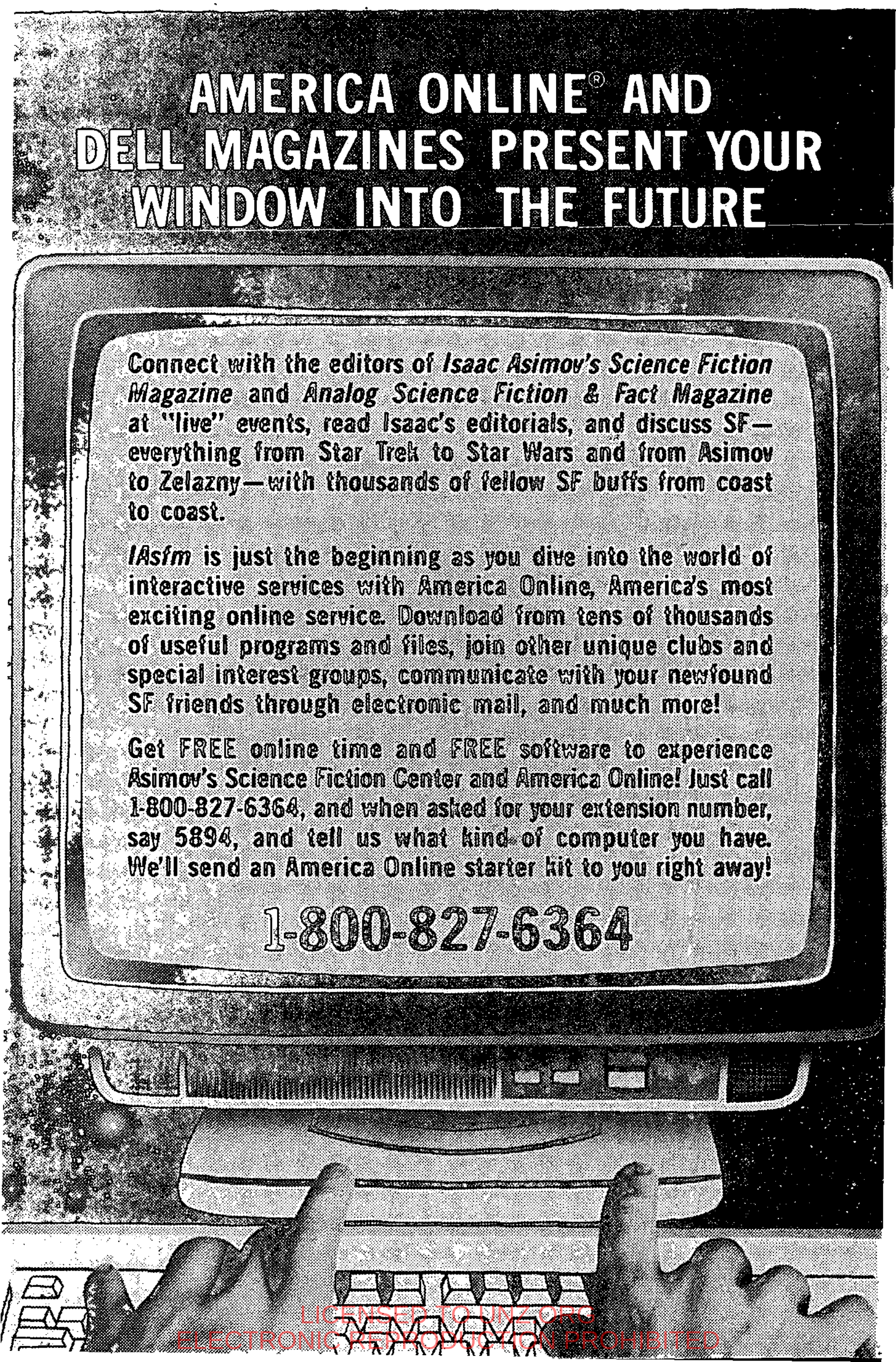
''Have they started again?'' he asked. Both women nodded. ''Either of you ready to eat?'' was Anton's next question. Jane shook her head, but Liz took a moment to think it over.

''Maybe a sandwich,'' she decided.

''Anything special?'' Anton asked. ''I'll call room service.''

''It doesn't matter,'' Liz said. Making a choice was simply too much effort. ''Surprise me. I eat anything.''

Anton took her at her word. As he pulled out his pocket phone, he turned away and crossed the room. When he



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Anton took her at her word. As he pulled out his pocket phone, he turned away and crossed the room. When he turned back to the women, he was smiling. "It'll be up in five minutes."

"Should I time it?" Liz asked. Anton seemed totally lost for a reply. But it was almost exactly five minutes later when the porter knocked.

The building started shaking at the same time.

Jane's bookviewer started to dance across an end table. That was what she noticed first. The word "earthquake" was slow to come to her. The shaking had gone on for several seconds before she realized what was happening. The trembling increased, a growing sound as well as the shaking. Anton reeled toward the wall in a drunken dance. Liz was seated behind the desk, holding on with both hands, her feet spread to try to attain some stability.

Anton lurched against the wall and fell. Jane's knees gave way and she tumbled to the floor in the center of the room.

Thirty seconds: the shaking still seemed to be intensifying. There was nothing anyone in the room could do but try to ride out the tremor. There was no room for anything but the experience, and fear.

The earthquake had been going on for nearly a minute before either of the women could take their minds up the mountain—to the climbers.

The Beast bucked and twisted. Ice cracked. The climbers from the two sections who were still on the ledge where they had stopped for lunch all dropped to their stomachs. Reflexes took over. Each man dug in with his ice axe to get one firm point while they worked to plant ice screws and secure ropes. Each man made certain that he was as safe as possible, then turned his attention to the others, looking to see if anyone needed help. Then they looked up toward the men who were out on the crest of the buttress, 200 feet above, 100 feet to the right.

And all they could do was watch.

Nigel's section was spread out, ten to fifteen yards between men. Nigel was at the top of the rope, his ice axe and the toe spikes of his crampons dug into the ice, just starting to put in an ice screw when the tremor started. He couldn't work against the shaking. All he could do was press himself against the ice and try to ride it out. *At least there's no rocks above to fall on us*, he thought. *Better now than when we're in that chimney*.

It was perhaps his last rational thought.

At first, the motion was too subtle—lost in the general trembling of the mountain—for any of them to notice. But then they felt the ice moving under them, sliding, picking up speed.

Nigel was the first to respond. He started scrambling to his right, toward the nearest edge of the sliding ice. The others started moving that way as well. Deke Ovillier took a desperate jump, using the last belay above him to swing and slide across the ice. At the end, he managed to land on ice that wasn't moving, digging in with his ice axe to keep from swinging back.

Voices clamored over the radio:

Oh, DAMN, damn, damn!—

Deke, set an anchor! For God's sake set an anchor!—

I'm *trying* to get off this damned ice—

'92

Run. RUN! The ice's falling! RUN!—

Forget the anchor, just GO!—

Finally on stable ground, Deke set himself as best he could and tried to belay the others until they could get clear of the sliding ice.

But it didn't work. The others slid past, gathering speed, and Deke had to make a fast decision. There would be time for recriminations later, but at the moment, there was no time for anything but one quick action. Without a firm belay, Deke couldn't possibly hold the other three men. He pulled his sheath knife and cut the rope that tied him to the others.

—D-a-m-m-n-n-n . . . The voice trailed off into a ghastly blubbering scream, fading into the general cacophony on the earphones. The transmissions grew suddenly fainter, more staticky, as the falling climbers toppled over the lip of the cliff below. But the others could still hear voices . . . screaming. Then there was silence.

Dead silence.

The bookviewer fell to the floor. The sofa, doing its own dance, bounced over it. Liz had joined Jane and Anton on the floor. Liz was under the desk, instinctively seeking whatever extra protection it might offer. But even the desk danced around on the thick carpet. The large picture window popped out of its frame and fell to the ground outside.

Anton was the only one of the three who had experienced a major earthquake before, and this one exceeded anything he had felt. Although he was dazed after hitting his head, he silently counted off the seconds that the room shook around him. By the time his count reached ninety, he had started to believe that he was counting too fast, that so much time couldn't possibly have passed—even though it seemed like hours.

There was a short pause in the shaking, only five seconds, not long enough for any of them to truly realize that the shaking had stopped. Then it started again, though not as fiercely.

From start to end, the earthquake lasted nearly three minutes.

When it was over, Anton still felt dazed. His head ached from the blow it had taken. Jane and Liz were even more stunned, though neither of them had been injured. Anton stared at the ivory-colored carpet, shocked when he saw several drops of blood hit it. He had bitten halfway through his lower lip sometime during the quake. He got up to his knees and reached for a handkerchief to dab against the cut—and to avoid marking the carpet any more than it already was.

"Are you two all right?" he asked. His voice sounded incredibly distant to him, as if someone else were speaking, a long way off.

Liz crawled out from under the desk, but stayed on her hands and knees.

"Oh, my God, the climbers!" Jane said. She lurched to her feet and grabbed for a talker.

There was nothing anyone could do for the men who had been carried away by the sliding ice. Morf saw the movement, almost as it started, but could do nothing except shout a futile warning into his radio. The ice on the ledge was shattering into small chunks and powder. Ice screws came loose even as they were secured. While the shaking shifted Morf and the seven others down toward the underlying rock on the ledge, they reached for hammers and pitons, anchoring themselves to solid rock as soon as it came within reach. Packs bounced madly. One lurched off the ledge before anyone could react and try to grab it.

None of the men on the ledge seemed to be in imminent danger of following that pack though, unless the entire ledge split away from the mountain. The greater danger was that they might be buried in ice falling from above. Climbing skins and safety helmets would do little good if they were buried under tons of ice.

The climbers pulled packs closer to them. If they were buried, but not crushed, they might be able to dig their way free. Oxygen wouldn't be a problem as long as their c-skins remained unbreached and their air masks weren't destroyed. This high, Mount BIT didn't offer enough oxygen on its own to keep them alive.

Morf and the others all felt ice hitting them, but none of the chunks were large enough to break bones. By the time the short pause came in the middle of the quake, the ice had quit coming down around them. And the sheet of ice had disappeared from the buttress, leaving nothing but bare rock . . . and Deke Ovillier, clinging to a precarious position on the far side of the slide.

When the quake ended, the surviving climbers remained flat for several minutes, checking their air flow and the integrity of their climbing skins. They moved shattered ice away from them. They tested their ability to move arms and legs, making sure that there were no broken bones, gauged the pain from the minor injuries the ice had inflicted. Everyone hurt, anything from minor distress to near agony, depending on how much ice he had been hit by.

Morf felt his heart pounding madly. He could hardly think beyond, *I'm alive!* at first. Then he looked around. Three men were gone, beyond any hope of help. The drop at the bottom of that buttress was over a thousand feet, straight down.

"Pull yourself together," Morf whispered, talking to himself. He leaned his forehead on his hand, willing his heart to slow. He was in superb physical condition. A shock could only disrupt his body for a short time, as long as he didn't panic or waste energy on futile theatrics. There was no sense to panic, or any bizarre attempt to try to get down to the men who had gone with the ice—to their bodies. Morf and his companions would look, and if there was any chance, they would try to recover the bodies and take them back off the mountain with them. But Morf held no illusions. It would be a recovery, not a rescue.

"Deke managed to cut loose in time," Sten's voice crackled on the radio. Morf needed a moment to recognize who it was. He looked up again. None of the climbers had risen from their prone holds yet.

"Any of you hurt badly?" Morf asked, noting with some relief that his voice was steady. Heads shook. There were voiced negatives.

"I saw one pack go. Any other supplies lost here?" Morf asked. Before they could deal with the loss of three men, they had to make sure that the survivors had the means to remain in that category. They were a long way from help.

While the others counted packs, Morf got to his knees and looked across the bare rock on the buttress to where Deke was reinforcing his position. Deke had moved onto bare rock and was putting in a bolt, the most secure anchor he had. He wasn't looking for help from the others yet. He was doing what any competent climber would do, making as certain of his own safety as possible. Next moves could come next, later—as much later as necessary.

"We might be safer on the buttress now," Sten said. "I don't see any overhang at the top. The quake cleaned that whole swath off."

"Give it a few minutes, Sten," Morf said, almost absently. "Let's concentrate on getting Deke back, or meeting him in the middle. Something." Then his pocket talker beeped.

Morf really didn't want to answer, not yet, knowing it would be either Jane or Liz, probably both. But he had to answer. They must have felt the quake, and if Morf didn't respond, they might assume that everyone had been lost. He pulled out his talker and pushed the accept call button. As soon as Jane gave him a chance to speak, he told her about the three men who had been lost, his voice crackling through the static.

"We're going to need time to sort things out here, Jane," Morf said. "I'll call back as soon as we do a thorough rec and decide what we're going to do." He waited for Jane's acknowledgment before he hit disconnect and turned back to the necessary work.

One step at a time, Morf told himself. He took a deep breath. His pulse and breathing were back to normal. He shoved the persistent *You've lost three men* aside for the moment. Brooding wouldn't help the dead; it could only endanger the living.

"The first thing is to get us all together," Morf announced. Then he took one more deep breath and started making decisions.

They used percussion bolts to anchor a double rope across the buttress. One blow from a hammer fired a chemical charge, driving the bolt into the rock. The point was deformed by the kick, but only after it had driven far enough into the rock to provide an almost absolutely secure anchor. They sank four bolts. Deke moved across the line to rejoin the rest of the team on the ledge where they had weathered the earthquake. Much of that ledge had been cleared of loose ice now.

Sten moved out along the double rope and slung another line to let him rap down to the fall-off at the bottom of the buttress. He held no more hope for the missing climbers than Morf did, but they had agreed that they had to look—just in case a miracle had allowed them to survive.

"There wasn't anything I could do," Deke said when he came face to face with Morf. "It was either cut loose or fall with them."

"I know. Don't worry about it," Morf said. "You did right."

"There was no time to even think." Deke had acted quickly before, without getting lost in emotion or fear, but he was shaking almost out of control now that the crisis was past.

"You did right," Morf repeated. "Sit down and take a few minutes. Have a cup of hot chocolate. We'll take care of things for now."

Ian Wilkes was standing by with a closed cup of hot chocolate, pressurized to keep it from boiling away. He helped Deke get the container hooked to his face mask.

"I've never been that close," Deke said after he had sucked down his first taste. He shivered as he recalled that final shriek in his earphones as his companions slid past. He knew he would remember it forever.

Ten feet away, Keener got up from his inventory of supplies. For a moment, he just stood there. Then he turned to Morf. "I'm starting to get cold," he said, fairly calmly.

Morf looked at Keener, waiting.

"I think it's my c-skins," Keener said. "I got hit by a lot of ice."

"Any holes in the suit?" Morf asked, moving toward him.

"Not that I can see. How about my back?" Keener stripped off his climbing gear and overalls, and turned his back to Morf for inspection.

"Not that I can see," Morf said after he finished. "Are you sure it's not just your head reacting?"

"No. Definitely colder. All that falling ice must have zapped too many of the bugs in my c-skins."

"Let's get a tent up with a stove," Morf said. "You'll have to change your skins." With the surrounding temperature close to minus 80 degrees Fahrenheit, they couldn't take chances.

One of the sealed stoves—open flames were impossible at this altitude—was already going with the hot chocolate container on it. While Morf and Keener pressurized the tent and moved the stove inside, Ian dug out a spare set of skins. Keener climbed into the tent. While he was changing, Morf looked around at the other climbers.

"Anyone else? We all took a lot of hits from ice."

People shook their heads, but slowly, taking time to gauge how cold they felt first. Even with c-skins and insulating clothing, the climbers had been cold since they topped 25,000 feet. But there were *degrees* of cold.

Keener was just coming out of the tent when Sten returned from his look off the end of the buttress. "There's no trace of the others. They fell at least a thousand feet, and all that ice is just piled up down there."

Five two-man tents had been erected on the ledge, but the nine surviving climbers were all outside, clustered together in the center of their tents and baggage. The sun appeared to be below their feet, low on the distant horizon, leaving their legs and lower bodies in thick shadow.

"As far as supplies go, we're in good shape," Morf repeated. "We lost three good men. There doesn't seem to be any chance we can recover their bodies." Everyone knew all that already.

He ran through his litany. "We owe it to Nigel and the others to continue on toward the summit. We're above 90 percent of the weather now. We'll be above all of it soon. Above all of the ice. The rock will be steeper but a lot sounder. We'll even be warmer, because the thin air won't carry heat away

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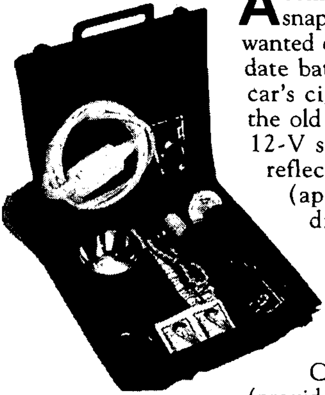

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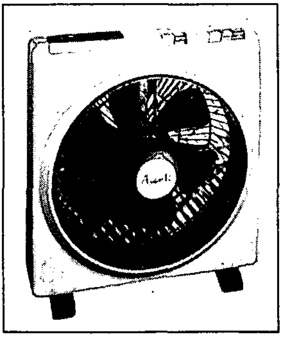

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so quickly."

The pep talk would sound more convincing if it didn't sound so rehearsed, Deke thought. *He's not asking, he's announcing.*

Keener had similar thoughts. *Yes, and we get up to where a hole in the c-skins isn't just painful, but lethal.* He was more shaken than he'd realized—and this wasn't the first fatal accident he had seen.

Morf paused, looking around for objections, but those with reservations kept them to themselves. He nodded slowly. "Let's get as much sleep as we can tonight. We'll camp here and push on in the morning. I'll call down to the hotel and let them know." *That's going to be another rough go,* he thought. *Jane's going to be livid.*

Jane managed to speak steadily into the microphone. "Despite the tragic loss of three of the team, the climbers are continuing upward. The team is establishing the advance base camp at the base of a chimney, above the icefield that collapsed during the quake. Morf Kazer has announced it will be named Carline Camp, in honor of Nigel Carline, one of the fallen climbers. Nigel was the one who advocated this approach, an advance camp at 40,000 feet, nearly at the Weatherline, the troposphere-stratosphere boundary. Virtually no snow falls above this point. Carline thought that climbing would be easier and even safer above the weather.

"Three team members will work out of Carline Camp for the time being, relaying supplies up the mountain. Time and supplies permitting, they will follow later."

* * *

Two more climbers had to change c-skins that evening, as the microbes in their suits succumbed. In the morning, Morf ordered a change for the rest of the team, just in case.

A thin film of new ice had formed over the buttress during the night. The climbers crossed using the lines they had established the afternoon before, and went on up to the base of the chimney that Nigel's section had been headed toward when the earthquake struck. They would set up Carline Camp there.

They took the rest of the day to do so, going easily and carefully, placing extra bolts to secure the pressure tents, anchoring supply packs thoroughly. Reaction to the previous day's events was sinking in, and no one wanted to be the next casualty.

The dead were still with them.

A couple of times Morf thought he heard the fallen climbers' voices in his earphones. He almost replied automatically, then stopped himself abruptly. He didn't believe in ghosts, but the incidents shook him. C-skins shut them off from the real world, left them too much with their own thoughts, away from honest sensations. He wondered if spacers, locked away in their suits, talked to imaginary companions.

Late in the day, Morf climbed up to the base of the chimney with Affy. He wanted to scout briefly, see what they were up against. They stared up the chimney. It was free of snow and ice, as far as they could see, but that wasn't far. The chimney angled to the right a few hundred feet above, and what lay above was hidden. They had to content themselves with pounding in a pin and rapping back down to camp, leaving the rope as a fixed placement for the next morning.

Morf didn't sleep well that night.

4.

The Weatherline on Mount BIT, like all climatological boundaries, is sharp from a distance but vague up close. The tropopause is not at a fixed height but varies from season to season, even from day to day. There is no height where snow abruptly ceases to fall. It just gets thinner and thinner, falling more and more seldom, tapering off all but imperceptibly. But eventually it is gone. Above, in the thin cold air of the stratosphere, dark blue sky deepens toward the black of space. Wind blows incessantly but feebly, weakened to impotence by its very thinness. The rock changes too. It is no longer pervasively shattered by frost riving, the erosion mechanism that flattens mountains that stretch into the snow's domain. The girdle of snow around Mount BIT, below the Weatherline, is a tightening noose around the throat of the peak, undercutting, scraping, gouging, shattering. It is rewarded intermittently by the thunder of rockfall, carrying down thousands more tons of rock, as the undermined strata above eventually yield.

Nature abhors a mountain.

"I can't believe they're going on," Anton said, dabbing at his lips with the linen napkin.

"Believe it," Arva said. They were in the dining room of her suite. "There's no chance they'll change their minds, either."

"You have to admire their audacity, I suppose," Anton said.

Avra snorted. "BIT's killed a lot of audacious climbers. They won't be the first."

"Or, most likely, the last," Anton added quietly.

Avra pushed her chair back. "We've been through all that before. The only way to stop people from trying to climb BIT would be to destroy the mountain, and that's not likely."

"Sooner or later, the Beast will destroy itself," Anton said. "There'll be one hell of an earthquake and the whole damn thing will slide down into the valley."

Avra let out a short laugh. "That garbage? Next off, you'll be visiting fortune tellers."

Anton wasn't fazed by his grandmother's opinion. "I've seen the reports, talked to some of the geologists. It *is* possible. The Beast is too unstable to last forever."

"Well, a million years from now, maybe," Avra conceded. "Geologists seem to think that's tomorrow or the day after."

A chimney normally represents an easy route, but this one was so long that it became difficult. The lead climbers pushed themselves, forcing a 3,000 foot ascent up the chimney in one day. The advance team was divided into three two-man ropes now. They took turns opening each 40 yards of chimney, each rope's length, moving up, putting in the pitons, chocks, and pulleys that let them speed the ascent of their comrades and equipment.

When the last of the climbers

emerged from the top of the chimney, it was sunset. They were so exhausted that they had to push themselves to erect tents, eat supper, and take the precautions that were absolutely essential in minus-80-degree weather and thin air. By the time Morf finished talking with Jane, he was almost asleep. He could scarcely keep his eyes open long enough to do his final checks.

But at least they were above the weather.

Keener nailed in the pin, hearing the reassuring "ting *ting* TING tink" of a solid placement faintly through the thin air. He missed the pungent smell of crushed rock and beaten metal when he sank a piton. He missed the gritty feel of the stone under his mittens. Most of all, he missed the fresh clean air of the mountains.

He clipped the etrier into the piton and stepped into it gingerly. Solid placement or not, sedimentary rock was always iffier than sound granite—and this limestone was slickened with organic matter, slowly seeping out and subliming into tar in the near-vacuum. He was nailing up a crack across an absolutely blank face. He had at least a hundred feet of direct aid climbing to go, and he didn't trust any of the piton placements.

He would sink one of their dwindling stock of percussion bolts in the middle of this pitch, clean climbing be damned.

Keener didn't like space. The near-vacuum around him made him profoundly uneasy. He'd done an airless climb or two, and had never felt like doing another. He didn't like being walled away so thoroughly from the environment. It felt dangerous, tucked away alone with his itches and sweat in a plastic bag. He wasn't in control.

He hadn't fully realized this climb would be so much like that.

The climbers passed the 50,000 foot mark early on Day 21, but upward progress slowed considerably after that. They had reached a point higher than any other team was known to have reached. Known was the key word. Leroux *might* have topped 50,000 feet on his third attempt. He hadn't been in constant contact the way this climb was, and satellite coverage had been much sparser in those days. No bodies had ever been recovered from the last Leroux climb. The precise point where they were lost was unknown.

Sten stared at the thunderstorm far below. A gray blanket of cloud, lit from within by a constant flicker of lightning, wrapped itself around the mountain's midriff. Fitfully glowing like a luminous carpet, it stretched away toward the horizon. Sten couldn't hear so much as a whisper of thunder. The air was much too thin above 51,000 feet. It was as though he sat in a giant theater with the sound turned off. It made Sten feel like a little child, overwhelmed by the scale of his surroundings.

They had talked briefly with the men still down at the Weatherline camp. They were all right, at least so far. They were above most of the storm themselves, but they could see—and hear—the intense electrical activity below them. They did have a spectacular case of St. Elmo's fire, wispy corona discharges like demented candles, streaming from every pointed metal ob-

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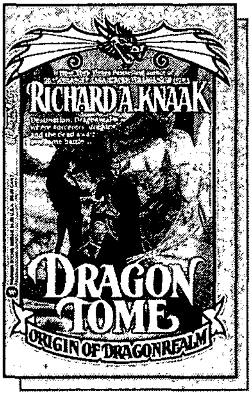

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A WORD FROM BRIAN THOMSEN

It seems like every summer around this time I wind up talking about quests, the mainstay of the epic fantasy plot (such as those featured in the novels of Richard Knaak). Yet quests also can figure prominently in other genres as well—Caine's search for his brother in *Kung Fu*, Ahab's hunt for the white whale Moby Dick, and Ponce de Leon's search for the fountain of youth.

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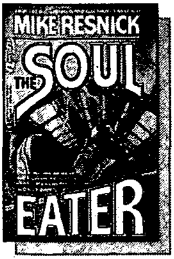

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ject. But it wasn't dangerous, and would even help forestall a lightning strike by bleeding off electrical charge. They had been forced to delay their departure though. They were supposed to have begun following the advance team today.

Sten wasn't afraid of heights. He could sit on the rim of the West Face and look out over two miles of vertical nothingness without a qualm. What bothered him was what those two miles represented, a displacement into an environment he found totally alien. He almost regretted that they'd gotten through the weather zone so quickly. That was familiar, usual. This felt so unreal.

A curious stone embedded in the ledge he was sitting on caught his eye. His gloved finger reached out, rubbed it. A shell. A fossil of some marine critter, embalmed in this limestone thrust up to the edge of space.

"Even more out of place than I am," he whispered. He got up and went into his tent.

Jane was shouting frantically into the talker. "Climbing team, do you read? This is base camp. A giant solar flare erupted at 9:45. Take cover immediately. Take cover!"

She listened intently, but all she could hear was static that snapped and popped with the tortured ionosphere. She repeated the message, once more, then again, listening for any hint of a reply after each iteration. "Morf, listen to me!" she added finally.

At last, Morf responded, after what seemed like hours but was really no more than a minute and a half. Jane could barely understand his words through the crackle.

"Base camp, we read. Solar flare. Understood. We have a large crack we will move into. Do you read?" The transmission started to repeat.

Jane let out her breath convulsively in relief.

Affy was leading the pitch when Jane's warning came. He was working up a thin open crack that followed a line of softer strata, using chocks and an occasional piton, mostly for protection, once in a while for direct aid. He was in a particularly difficult free-climbing section. He couldn't stop where he was, and had to climb another 20 feet to a tiny ledge first.

Now what? he asked himself. *Garay Scwinski died like this*—caught in the open, in the middle of a pitch, with a shower of relativistic protons headed his way. Traveling almost as fast as the light from the flare itself, they would be arriving within 15 minutes. The shower of secondary neutrons they would generate would spray a lethal, invisible rain through the upper atmosphere. The team had to be behind rock by then.

If they could make it. Affy was a long way above his last protection, with Sten, his belayer, also exposed to the sun.

After the initial shock, Affy's mind worked quickly. First, where was shelter? He queried Sten over the radio.

"Work laterally into the big dihedral, the one with the overhang we decided against for a route. Morf thinks it's big enough to have shadow all day." He referred to a long notch that almost paralleled their route. It had an awkward-sized crack in it: too narrow for a chimney, too wide for a layback. Even worse, it ended at a large overhang. They had dismissed it as a route for that reason.

But it could serve a much more important purpose now. They could squeeze into the crack, at least in some places, and put lots of rock between themselves and those neutrons. Apparently Morf thought so, anyway, and if *he* could fit in that crack, anyone could.

The problem was that the long crack was 150 feet to the right of Affy's position, across an absolutely sheer face. He couldn't just rap back down to the belaying position where Sten was, either. As he climbed, he'd had to work to the left, so that he was to Sten's left as well as above him. He was directly over the steep ridge above the West Face itself.

He certainly didn't have time to *climb* down, not by a long shot. Which meant that he had to find a *good* place to sink an absolutely reliable anchor. He inspected the rock within reach of each hand, and wasn't impressed with what he found. But again, he had no time. . . . He chose what looked to be the best site, took his last percussion bolt, sank it, snapped on a 'biner and clipped a sling into it. Now he was protected by the bolt, not the belaying rope.

He radioed down to Sten. "OK, I'm tied off. Get to cover!" Sten scrambled after the others, moving along the fixed rope they'd left behind. Affy pulled off the rope he was carrying. It was already doubled over—it had been coiled that way—so he just needed to find the middle and drop it through the carabiner on the bolt.

Affy worked fast, only partly because of the flare. It also helped keep his mind off what he was going to have to try. He would have to rappel down level with Sten's belaying position and then pendulum over to where he could grab the fixed rope the others had left. Even if the anchor held under his swinging, the maneuver would be tricky in Stonehaven's gravity. No rational climber did a pendulum traverse in anything but an emergency.

This was an emergency.

He looped a quick overhand knot into the double strand of his rappel rope, and quickly fed the rope out, letting it dangle below him, over nothingness. The knot was to keep the rope from going all the way through the rappel brake if he got too near the end. Like all big-wall mountaineers, Affy'd heard of climbers forgetting to knot their rappel rope and then rapping right off the end. He shuddered. It was bad enough to die, but to die so *stupidly*. . . . He worked his way down the rope, more rapidly than he would have had he not been under acute pressure, but still careful to remain close to the wall. The bolt was less likely to pull out if he pulled down as much as possible, keeping the tension sideways rather than outward.

Here goes, he thought. At least if the bolt pulled, it would be quicker and cleaner than acute radiation sickness, the way Scwinski had died.

Affy swung tentatively, scraping along the wall, miles of thin air below the soles of his boots. He watched the bolt intently—not that there was anything he could do if the placement failed.

It held. He swung farther, a longer

arc, still close to the cliff; then longer and longer, running sideways along the cliff, still trying to keep his weight as much as possible down rather than out. Finally he launched himself like a trapeze artist at the fixed rope.

He grabbed it, although the jerk as he did so felt as if it would dislocate his arms. He pulled himself up quickly and clipped in to the anchors Sten had been belaying him from not ten minutes before. Only then did he undo his rappel brake. Shaking the rappel rope free, he pulled on one end to recover it.

It snagged on something and he tugged harder. The anchor bolt suddenly pulled out, and slid along the rappel rope, skittering down the cliff face as the rope dropped. Then it fell off the end, clanging faintly when it hit the cliff below and bounced. Transfixed, Affy watched the bolt, carabiner still attached, bounce down the west face. He lost sight of it long before it reached the bottom.

Affy found he was shaking violently. He finished reeling in the rope and headed toward the crack where the others huddled, working his way along the fixed rope.

Sten gingerly stuck a portable dosimeter up over the edge of the dihedral on a long handle. He was down below with the others, in shadow.

"Affy, get inside!" he said. "The count is skyrocketing."

Affy, almost at the crack, didn't bother replying. He could hardly hear through the static, even from less than 50 feet. But as he worked his way over the edge of the dihedral, he couldn't resist looking back at Stonehaven's sun. He gazed for long seconds, secure—or so he thought—behind his mask. *It doesn't look any different*, he thought, heedless of the particles slicing through the mask. He didn't think of the microbes there, struggling to pull O_2 against the pressure gradient from the thin air outside into the breathable air behind his mask.

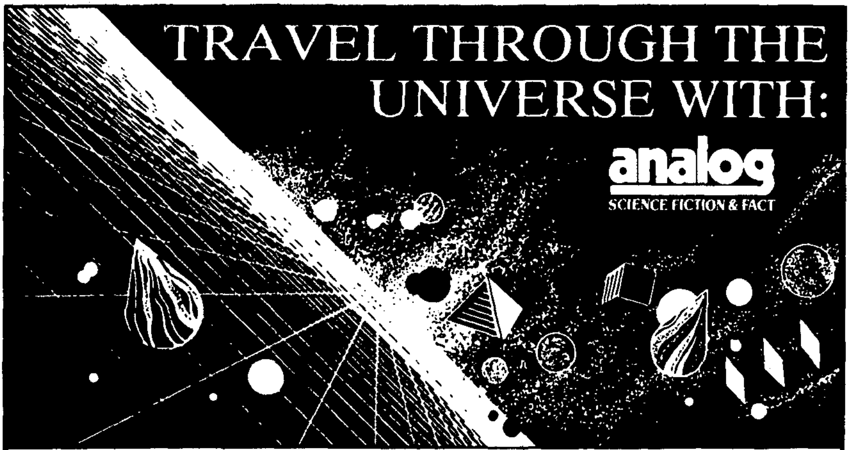
Nigel could have warned him.

That evening, as he tried to sleep in their unscheduled bivouac, Affy thought his breath felt rather short. Psychological, he thought vaguely. *You're tired of living in this sack, and you had as close a call today as you ever want—on a mountain higher than any mountain has a right to be.* That seemed funny, and he giggled to himself sleepily.

Nigel could have warned him there, too.

Jane was finishing the evening's update. "The climbers have taken shelter from the solar storm in a deep crack." It was getting to be too much effort to put feeling into the reports. "They expect to stay there at least a day, until the worst of the flare particles have passed. The team did have a good break today, one that's especially valuable since they'll lose time waiting. They found an ice pocket in the crack." They had found shiny black ice encrusting the rock like a glistening fungus, the first ice they'd seen since Carline Camp; vapor that had been cold-trapped, frozen out and shielded from resublimation by permanent shadow.

"Above the Weatherline, water is a major logistical problem, since the team can't just scoop up ice or snow to melt any longer. They had to bring a lot of



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water with them from Carline Camp. So today they chipped out ice and melted it." Morf said it tasted oily, from the tar smearing the rocks, but the climbers drank it anyway.

"Do you think they'll actually reach the summit?" Liz asked quietly as soon as the camera was off. The question had become routine.

"I don't know," Jane said, as usual. "I wouldn't be a bit disappointed if they decided they were high enough and started back down now. Morf would scream if he heard me say that."

"So would Affy," Liz said. "But they won't quit, not unless there's just no way to go on."

"I know," Jane said. "I guess I wouldn't either."

Affy led again when they were able to leave their impromptu shelter. Sten was belaying him again. It felt good to be moving, to be doing something strenuous after eighteen cramped hours in that crack, practically not moving. In fact, Affy had felt sort of light-headed for a little bit, right after they moved out, but now he felt fine.

In fact, he had never felt better: this was the life, back on the mountain, doing what they'd come to do. A tremendous wave of euphoria swept over him like the rush from some injected drug, buoying him. He didn't notice that he was singing loudly but tunelessly to himself, that he was moving erratically and clumsily. The back of his mind realized that something was seriously wrong, but that was just a cloud on the horizon, easy to ignore.

His companions were asking him if he was all right. They got louder, more insistent, when he didn't respond. Affy tried to ignore the silly voices for a time, but finally he switched off his earphones. Really! Couldn't they see he was *busy?*

Affy swung the hammer wildly, in the general direction of a piton stuck partly into the crack. *Why won't that pin stay still?* The erratic blows from the hammer knocked it back and forth, not straight in, but Affy was in no shape to figure that out.

Well, that will have to do, he decided. He stopped bashing at the rock. The pin was stuck only partway into the rock, angled downward—a placement no climber in his right mind would accept.

Affy clipped into the pin anyway and started to climb past it. He slipped and felt himself start to fall. *That's all right. I have a rope, don't I?* He dreamily watched the piton pull out as his weight came onto the rope. He felt himself tugged sharply, then begin to accelerate again as the chock below also pulled.

Then he felt a violent slam against his side and profound pain shot through him. Tears stung his eyes. *Why did the mountain hit me?* He started whimpering brokenheartedly, like a child struck for no reason.

Another slam, another thrill of agony, was enough to cut through the anoxic haze, at least partly. His body started trying to protect itself, trying to slow his fall. But it was far too late.

The rest of the team watched, horrified but helpless. Until Affy's fall was arrested by an anchor that held, there was nothing they could do but watch. Sten, belaying, frantically wrapped the rope all the way around his body and held on grimly. Belaying a leader fall was always difficult, even when he hadn't fallen as far as Affy. And it always tested just how good your anchor was. Even if *you* held the fall, your anchor might not.

Sten *oofed* as the rope suddenly tightened around his body with Affy's weight, cutting into his belly. It jerked him off the rock, twisting him around like a hanged man. Eyes closed, he held on grimly. The only thing in the universe was that rope . . . and his grip on it.

The anchors held, although Sten was now suspended out over the West Face, entangled in rope like a fly in a spiderweb. Even though his fall was arrested, Affy smashed back into the wall below. Everyone saw his faceplate shatter on impact. He dangled on the rope, swinging back and forth slightly but otherwise unmoving, suspended 50 feet below Sten; many thousands of feet above the base of the West Face.

The other climbers scrambled over while Sten tied off the belay and pulled himself back onto his belay ledge. Morf clipped into one of the anchors with another rope. He knotted the end, tossed it over the void, and rapped down to see if he could help Affy.

He couldn't. No one could.

The signs of the earthquake were still everywhere. The replica of Mount BIT, with its roster of names, in front of the Hillary Inn was canted away from the hotel at a 30 degree angle. The ground on the hotel side of the replica was eight inches higher than on the far side. Liz Mack walked across the lawn, south, almost southwest, toward the nearby village—away from the Beast. Tears pooled up in her eyes to burn and half-blind her. She stumbled a couple of times, tripped over her own feet, hurrying from nowhere to nowhere, propelled by a blind need to move, to do anything but think.

There was more visible damage to the village than to the hotel. The only significant damage to the Hillary was a dozen windows that had popped out of their frames. But there were open cracks in the walls of several houses, and one house had collapsed.

Liz noticed bits and pieces, hardly aware of what she was seeing. The farther she got from the hotel, the slower her pace became, and eventually, she found herself standing still, shaking, staring across the rolling countryside southwest of the hotel.

Affy's dead. She repeated the thought, then reached up to rub the tears from her eyes. "Affy's dead." This time she spoke the words. *We always knew it could happen.* But she had never really believed that. It was always someone else. She wiped at her eyes with both hands, fighting a stream of tears. Then she turned to stare back over the roof of the hotel at Mount BIT.

"You were on top of the world, higher on the Beast than any other man ever," she whispered, knowing that Affy would at least have appreciated that. "If you had to go, that's the way you'd have wanted it."

It helped, if only a little.

"I think we should continue toward the summit," Morf said quietly. He waited for any protest, but no one spoke out. "No one's ever been this close. We have the supplies we need. And if we don't go on now, we may never have another chance.'' He paused again, then continued. ''I want this peak so badly that I can hardly think of anything else,'' he admitted. ''We owe it to the men we lost. We also owe it to ourselves. We have a lot of years invested in this expedition, every one of us. If we give up now, what are the odds that any of us will ever have another chance?'' He looked around. He had gone as far as he could. It was time to put the question.

Everyone was mindful of the mute lump lashed below the bivouac. They had recovered Affy's shattered body and would try to bring it back with them, on the way down.

''Let's vote. All in favor of continuing?'' Morf raised his hand.

Other hands were slow in rising. The last two were Keener and Ian. They only voted with Morf after seeing that everyone else had.

Morf nodded. ''All right, let's push on then. Sten, you want to lead now?'' Sten nodded once, a quick jerk of acquiescence. They began repacking, reforming the climbing teams. Morf made the call down to the hotel.

Avra Gordon-Sommers was sitting in the lobby when Liz returned to the hotel. Anton was standing by the door to warn his grandmother. When he told her that Liz was returning, she got up and walked to the door, waving Anton away. He didn't question his dismissal. It was welcome.

''I'm sorry,'' Avra said when Liz came through the entrance. Liz stopped, surprise showing through her grief. She had met the Grand Old Lady of the Hillary—everyone in the Kazer party had—but it was a shock to run into her like this. ''I know exactly what it's like,'' Avra continued. She put a hand on Liz's arm and turned to walk with her. ''I've been there.''

''I'm not sure I know what it's like yet,'' Liz said. ''I just feel numb.''

Avra nodded. ''Why him? Why me?'' A deep breath, something of a sigh. ''I'd ask you up to my suite, but the quake popped one of my windows and the repair crew is up there.'' Avra shook her head. ''I told my grandson to see to the guest rooms first, but sometimes he just doesn't listen.''

''Where are we going?'' Liz asked. Avra was steering her somewhere, but Liz wasn't sure where. Or why.

Avra chuckled. ''Back to the secret depths of the Hillary, my dear. We have a delightfully informal conference room hidden among the offices. Just slightly decadent.''

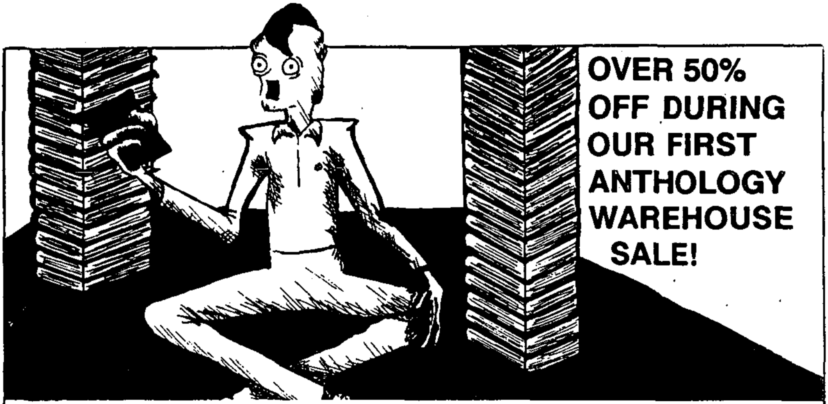
''I should get back to our suite,'' Liz said, slightly resisting Avra's pull. ''Jane might need me.''

''In a bit,'' Avra said, tightening her grip. ''Anton is up there.''

''He must have other work,'' Liz protested. The last thing she wanted was to be hauled away to listen to the old woman's commiseration or—even worse—her recollections of other deaths on the mountain.

''The routine takes care of itself,'' Avra said. ''It's the extraordinary that needs the hand of experience. That's why Anton is with your friend, and why I'm with you. Trust me.''

Do I have any choice? Liz wondered



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as she quit resisting and went with Avra.

Tomorrow. The day after. The climbers moved ever more slowly upward. Reaction set in to the sustained stress, to the earthquake and its losses, to the forced day going up the chimney . . . and now, the solar storm and Affy's bizarre death.

It would almost have been better had he just fallen, Keener thought. That would be easier to accept. But anoxia . . . they had finally figured that the solar flare had killed too many of the microbes in the facemask, so that his oxygen pressure was too low. With the sustained exertion of climbing, Affy had simply run out of air.

It brought home their vulnerability. They needed their c-skins to stay alive, but those skins could also kill them in ways that they might not recognize in time. Keener found it profoundly disquieting. He felt that things were completely out of control. His environment could turn on him, and he might never know.

Although the pitch was easier in these two days, the total height gained by the team was less than half of what they had made before taking refuge from the solar storm. The climbers took excessive care with safety precautions, and made camp early each evening, as soon as they reached a suitable site.

Morf sat in his tent after the third day of post-flare climbing. He had his air bubble over his head and was forcing himself to eat. It was slow going, like the climb. Morf almost forgot what he was doing between bites. He had to keep reminding himself to eat.

The way we're going now, it'll take another week to reach the top, he told himself. He tried to calculate the supplies. That extra day hiding from the solar storm hadn't helped. *It's going to be close, unless we speed it up a bit.* He wasn't sanguine about the prospects for accelerating his companions, or himself.

Quit now, when we're this close? That was almost as difficult to accept. But was there any choice?

Give it one more day, he decided. *See how far we get tomorrow*. Morf finished his meal, shoveling the rest of the food down as quickly as he could. Behind him, Deke coughed and cleared his throat a couple of times as he got comfortable in his sleeping bag, ready to sleep.

A good idea, Morf thought. He put aside his spoon and the food container, partially collapsed the air bubble, and replaced his face mask. A good night's sleep. The idea was irresistible.

"I don't believe they're *still* going on, even with this latest accident," Anton said. He was in Avra's suite. She sipped one of her rare near-lime and gins.

"If only there were some way we could effectively order them off the mountain." Avra bit off an instinctive sigh. "Climbers." The word was invective the way she used it. "Haven't got half the sense God gave a cricket."

"Do you think they might actually reach the summit now?" Anton asked.

"Obviously, they have a better chance than anyone else has ever had. They're near 60,000 feet. Another 8,000 feet does it." Avra shrugged. "Do I think they'll make it? No."

"How's Mrs. Mack doing?"

Avra shook her head. "She went back to help Jane Kazer get ready for the evening broadcast. She could hardly keep from crying, but she says she supports the decision to go on."

"A remarkable woman," Anton said. "Both of them are."

"Better than their husbands deserve—deserved," Avra said.

Sleep refused to visit Keener Sofit. He lay alone in his two-man tent, the odd man. *I've seen death on mountains before*, he reminded himself. Why was this time different? He knew why: he felt trapped, felt that dangers he didn't understand and couldn't control could reach out and grab him at any second. A dark wave of depression swept over him.

I really don't want to go on. There's no point now. But he hadn't been able to vote against continuing. He wouldn't be the lone objector. *How many of the others really feel the way I do?* How many were just "going along" with Morf? Ian had been reluctant to raise his hand. Sten had watched Affy die, close up, while he dangled over the West Face. And Keener suspected that Deke must have been reluctant to continue. Deke had come too close to dying himself. *I've seen the look in his eyes*, Keener told himself.

Sunset was three hours past. The others had almost certainly been asleep for most of those hours. But even though Keener was exhausted, sleep wouldn't come.

Why do we do it? The answer wasn't nearly as obvious as it had always been before. Keener could hardly recall the often facetious answers he had given to that inevitable question in the past. He seemed to be struggling against a wall in his mind. The heavy despair he felt had settled like a blanket over everything.

No one would ever know exactly what time that night Keener reached his decision. All anyone would be able to infer was that, sometime between sunset and sunrise, Keener Sofit got out of his tent and walked off the West Face of Mount BIT.

Morf sat on a pack and stared at the one tent still standing, Keener's tent. It was empty. *We'll leave it there*, Morf decided. Ultraviolet light would break it down. The shrill but feeble wind would blow the tatters off sooner or later. It was about all the thinking Morf was capable of. His mind was still numb from the shock of finding that Keener had gone off the side of the mountain during the night. He had known Keener for a lot of years. They had made several major climbs together, on Buckingham and, before the war, on other worlds.

Only slowly did Morf's mind get around to, *Why did he do it?* Morf was certain that it hadn't been accidental. There was no need to leave a tent during the night. The climbing skins recycled all waste. Exposing any parts of the body to the 60,000-foot-plus atmosphere for any reason was unthinkable. Deke had a painful hematoma, just from a minor suit rip he hadn't noticed right away.

Anoxic confusion? Maybe . . . almost certainly. Keener wouldn't have done anything like this in his right mind. *He couldn't have.* Morf bashed down doubts.

Finally, he lifted his gaze from the abandoned tent. He looked at the blue-black sky, toward the summit still almost a mile above, and hidden by the bulge of ridge in front of him. The others had packed for the day's climb. They were waiting for him, staring at him. Slowly, Morf stood.

"That's it," he said. "We're going back down." No hesitation, no debate—no vote. "The Beast has beat us." Nobody protested, but Morf continued anyway, with justifications no one needed. "If our masks are failing, we could *all* walk off the mountain and not know what we're doing."

Still no one said anything. After a pause, Morf called Jane to let her know, then Morf and Sten got together to plan the first stages of the descent. At least it would be faster going back down.

Even though it would seem to be a lifetime.

"Excuse me, young man."

Anton couldn't completely suppress the smile that came to his face at being called a young man, even though the woman was nearly as old as his grandmother.

"Yes, Mrs. Essex?" he said, as politely as ever.

"Is it true that the climbers will be down this afternoon?"

"Yes, ma'am. They should be off the mountain by three, back here at the hotel before four o'clock."

"Would it be possible to go see them actually step off of Mount BIT?"

"Certainly. The hotel is sponsoring a reception excursion. I'm sure there are seats available." He would make sure she had a seat even if the excursion were fully booked, but her request deflated his pleasure. "We'll be leaving at one thirty." We. Anton would go to greet the remaining climbers when they stepped off the Beast. It was his duty. He would be there to extend the condolences and congratulations of the staff. He would be there to see what the climbers needed in the way of immediate attention. He would be there to be part of the record that would be flashed throughout the Commonwealth as quickly as ships could disseminate the recorded bubbles.

"It seems a shame they couldn't go on to the top," Mrs. Essex said, shaking her head. "They were so close."

"Yes, ma'am, 14,000 feet closer than anyone else. But after losing a fifth man—"

"Oh, yes. That was terrible, terrible." Mrs. Essex seemed to get carried away with clucking her tongue and shaking her head. She turned and started walking away. After a moment she stopped and turned back to Anton. "One thirty, you say?"

"Yes, Mrs. Essex."

"You know," she said before she continued to walk away, "I even met Leroux, after his second attempt."

I know, Anton thought as she left the reception salon. *You're one of our most regular ghouls*. Then he chastised himself for even thinking of a regular guest that way, and went back toward his office.

He was hardly surprised to find his grandmother waiting there, sitting in his chair.

"The Kazer party will be leaving Stonehaven in four days," she said.

"Mrs. Kazer has just made the reservations."

Anton nodded. Climbers rarely stayed long after a failure, unless injuries prevented their early departure. Four days. That was the soonest they could get a liner heading back to Buckingham.

"When is that group coming in from Avalon?" Avra asked.

"The third of next month," Anton said. "Two suites, eight single rooms. Marcus Inkster and party."

"Three weeks," Avra said. "We don't usually get them that close together."

Anton shrugged. "It's going to get worse. Kazer made the climb look possible. Now teams will figure they have to push to be the first. I wouldn't be surprised to see Kazer make another attempt in the next year or two."

"Yes." Avra sighed. "I almost wish they had reached the top. Maybe that would have stopped some of the others."

"Not many. Someone would always want to do it faster, cleaner, by a more difficult route, something. You know what they're like."

Avra stood slowly. "Yes, I know what they're like."

She was feeling every one of her 117 years as she walked from the office. ■

●Man's capacity for justice makes democracy possible but man's inclination to injustice makes democracy necessary.

Reinhold Niebuhr

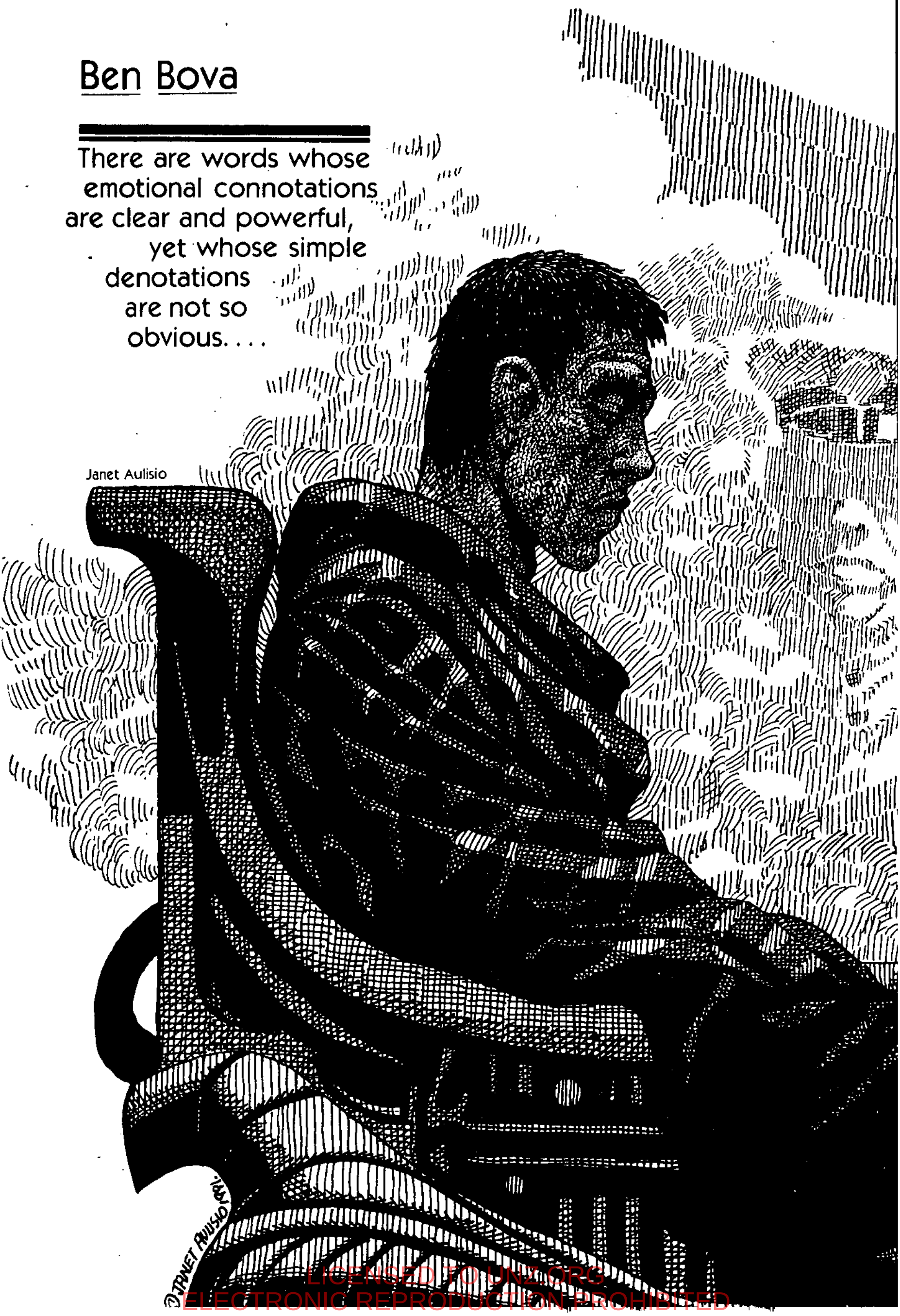
●Justice is my being allowed to do whatever I like. Injustice is whatever prevents my doing so.

Samuel Johnson

Ben Bova

There are words whose
emotional connotations
are clear and powerful,
yet whose simple
denotations
are not so
obvious. . . .

Janet Aulisio



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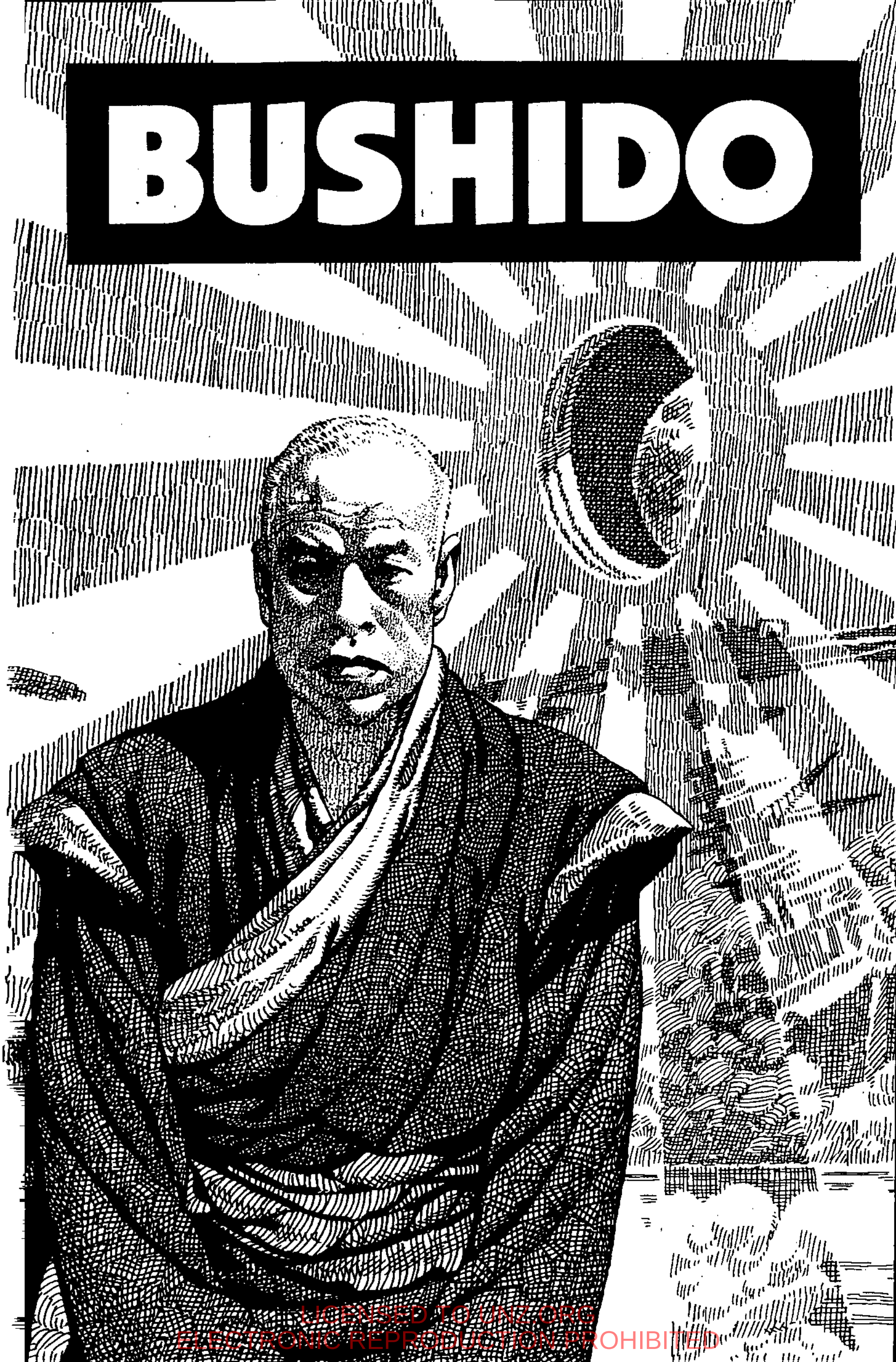


Saito Konda grimaced against the pain, hoping that his three friends could not see his suffering. He did not want their sympathy. He was far beyond such futile emotions. All that was left to him was hate—and the driving will to succeed.

He was sitting in his laboratory, his home, his hospital room, his isolation chamber. They were all the same place, the same metal-skinned module floating five hundred kilometers above the Earth.

The two men and one woman having tea with him had been his friends since undergraduate days at the University of Tokyo, although they had never met Konda in the flesh. That would be the equivalent of murdering him.

They were discussing their work.

"Do you actually believe you can succeed?" asked Miyoko Toguri, her almond eyes shining with admiration. Once Konda had thought she might have loved him; once he had in fact loved her. But that was long ago, when they had been foolish romantic students.

"I have solved the equations," Konda replied, hiding his pain. "As you know, if the mathematics have beauty, the experiment will eventually be successful."

"Eventually," snorted Raizo Yamashita. Like the others he was sitting on the floor, in deference to Konda's antiquated sense of propriety. Raizo sat cross-legged, his burly body hunched slightly over the precisely placed low lacquered table, his big fists pressed against his thighs. "*Eventually* could be a thousand years from now."

"I think not," said Konda, his eyes still on lovely Miyoko. He wondered how she would look in a traditional kimono, with her hair done properly. As it was, she was wearing a western-style blouse and skirt, yet she still looked beautiful to him.

The two men wore the latest-mode glitter slacks and brightly-colored shirts. Konda's nostrils flared at their American ways. The weaker America becomes in real power, the more our people imitate her decadent styles. He himself was in a comfortable robe of deep burgundy, decorated with white flying cranes.

It happened that Konda reached for the teapot at the same moment that Miyoko did. Their hands met without touching. He poured tea for himself, she for herself. When they put the pots down again, her holographic image merged with the real teapot on Konda's table. Her hand merged with his. He could not feel the warmth of her living flesh, of course. If he did, it would undoubtedly kill him.

Tomoyuki Umezi smiled, somewhat ruefully. The window behind him showed the graceful snow-capped cone of Fujiyama. He raised his tiny cup.

"To the stars," he toasted.

The other three touched their cups to his. But they felt no physical contact. Only their eyes could register the holographic images.

"And to time," Konda added, as usual.

Back in their university days, Tomo had laughingly suggested that they form a rock group and call it the Four Dimensions, since three of them were trying to conquer space while Konda was pouring his soul and all the energy of his wasting body into mastering time.

They had never met physically. Konda had been in isolation chambers all his life, first in an incubator in the AIDS ward of the charity hospital, later in the observation sections of medical research facilities. He had been born with no effective immune system, the genetic gift of his mother, a whore, and whoever his father might have been. They had also gifted him with a chameleon virus that was slowly, inexorably, turning his normal body cells into cancerous tumors.

The slow and increasingly painful death he was suffering could be brought to a swift end merely by exposure to the real world and its teeming viruses and bacteria. But the medical specialists prevented that. From his unwanted birth, Konda had been their laboratory animal, their prized specimen, kept alive for them to study. Isolated from all the physical contamination that his body could never cope with, Konda learned as a child that his mind could roam the universe and all of history. He became an outstanding scholar, a perverse sort of celebrity within academic circles, and was granted a full scholarship to Tokyo University, where he "met" his three lifelong friends. Now he lived in a special module of a space station, five hundred kilometers above the Earth's surface, waited upon by gleaming antiseptic robots.

The four of them did their doctoral theses jointly, a theoretical study of faster-than-light propulsion. Their studies were handsomely supported by the corporations that funded the university. Japan drew much of its economic strength from space, beaming electrical energy to cities throughout Asia from huge power satellites. But always there was competition from others: the Europeans, the Chinese, the Arabs were all surging forward, eager to displace Japan and despoil its wealth.

The price of peaceful competition was a constant, frenetic search for some new way to stay ahead of the foreign devils. If any nation achieved a faster-than-light drive, the great shoguns of industry insisted that it must be Japan. The life of the nation depended on staying ahead of their competitors. There could be no rest as long as economic ruin lurked on the horizon.

For all the years since their university days, the three others continued to work on turning their theories into reality, on producing a workable interstellar propulsion system: a star drive. Miyoko accepted the chair of the physics department at the University of Rangoon, the first woman to be so honored. Dour Raizo became the *doyen* of the research laboratory at a major aerospace firm in Seattle, USA, long since absorbed into the Mitsubishi Corporation. Tomo waited patiently for his turn at the mathematics chair in Tokyo.

From the beginning, Konda had been far more fascinated with the temporal aspects of space-time than the spatial. Since childhood he had been intrigued by history, by the great men who had lived in bygone ages. While his friends labored over the star drive, Konda strove to produce a time machine.

In this he followed the intellectual path blazed by Hawking and Taylor and the AAPV group from the unlikely location of South Carolina, a backwater university in the backwater USA.

He felt he was close to success. Alone, isolated from the rest of humanity except for the probing doctors and these occasional holographic meetings with his three distant friends, he had discovered that it should be possible to tap the temporal harmonics and project an object—or even a person—to a predetermined point in spacetime. It was not much different from achieving interstellar flight, in theory. Konda felt that his work would be of inestimable aid to his three friends.

His equations told him that to move an eighty-kilo human being from the crest of one space-time wave to the harmonically similar crest of another, would take all the energy generated by all of Japan's power satellites orbiting between the Earth and the Moon for a period of just over six hours. When he was ready for the experiment, the Greater Nippon Energy Consortium had assured him, the electrical power would be made available to him. For although the consortium had no interest in time travel, Konda had presented his work to them as an experiment that could verify certain aspects of faster-than-light propulsion.

Konda had to assemble the equipment for his experiments, using the robots who accompanied him in his isolation module of the space station. His friends helped all they could. Konda had to tell them what he was trying to do. But he never told them why. He never showed them the hatred that drove him onward.

They thought he was trying to help them in their quest for a star drive. They believed that if he could transport an object across time, it would help them learn how to transport objects across light-years of space. But Konda had another goal in mind, something very different.

Konda dreamed of making contact with a specific person, longed with all his soul to reach across the years and summon one certain hero out of history: Isoroku Yamamoto, Grand Admiral of the Japanese Imperial Fleet in the year 1941 (old calendar). Admired by all, even his enemies, Yamamoto was known as "the sword of his Emperor."

Konda remembered the day when he first told his friends of his yearning to reach the doughty old admiral. "There are no men like Yamamoto any more," he had said. "He was a true *samurai*. A warrior in the ancient tradition of *bushido*."

Raizo Yamashita had laughed openly. "A warrior who started a war that we lost. Badly."

Tomoyuki was too polite to laugh, but he asked curiously, "Didn't Yamamoto boast that he would defeat the Americans and dictate the terms of their surrender in the White House? He didn't even live long enough to see the war end in Japan's humiliation."

Miyoko rushed to Konda's defense before he could reply for himself. "Admiral Yamamoto was killed in the war. Isn't that true, Sai?"

"Yes," answered Konda, feeling weak with helpless rage at the thought. "He was assassinated by the cowardly Americans. They feared him so much that they deliberately set out to murder him."

"But to contact a man from the distant past," Tomo mused. "That could be dangerous."

Raizo bobbed his burly head up and down in agreement. "I read a story once where a man went back to the Age of Dinosaurs and killed a butterfly—accidentally, of course. But when he came back to his own time the human race didn't even exist!" He frowned, thinking hard. "Or something like that. I don't remember, exactly."

As usual, Miyoko stood up for Konda. "Sai won't tamper with history, will you?"

Konda forced himself to smile faintly and shake his head. But he could not answer, not in honesty. For his overwhelming desire was to do precisely that: To tamper with history. To change it completely, even if it did destroy his world.

So he hid his motives even from his dearest friends, because they would never understand what drove him. How could they? They could walk in the sunlight, feel wind on their faces, touch one another and make love. He was alone in his orbital prison, always alone, waiting for death alone. But before I die, he told himself, I will succeed in my quest.

Once his equipment was functioning he plucked a series of test objects—a quartz wristwatch, a bowl of steaming rice, a running video camera—over times of a few minutes. Then a few hours. The first living thing he tried was a flower, a graceful chrysanthemum that was donated by one of the space station's crew members who grew the flowers as a hobby. Then a sealed beaker of water teeming with protozoa, specially sent to the station from the university's biology department. Then a laboratory mouse.

Often the power drain meant that large sections of Shanghai or Hong Kong or one of the other customer-cities in Greater East Asia had to be blacked out temporarily. At the gentle insistence of the energy consortium, Konda always timed these experiments for the sleeping hours between midnight and dawn, locally. That way, transferring the solar power satellites' beams from the cities on Earth to Konda's laboratory made a minimum of inconvenience for the blacked-out customers.

Carefully he increased the range of his experiments—and his power requirements. He reached for a puppy that he remembered from his childhood, the pet of a nurse's daughter who had sent him videotaped "letters" for a while, until she grew tired of speaking to the taped image of a friend she would never see in the flesh. The puppy appeared in the special isolation chamber in Konda's apparatus, a ball of wriggling fur with a dangling red tongue. Konda watched it for a few brief moments, then returned it to its natural space-time, thirty years in the past. His eyes were blurred with tears as the puppy winked out of sight. Self-induced allergic reaction, he told himself as he wiped his eyes.

He spent the next several days meticulously examining his encapsulated world, looking for changes that might have been caused by his experiment with the puppy. The calendar was the same. The computer programs he had set up specifically to test for changes in the spacetime continuum appeared totally unaffected. Of course, he thought, if I changed history, if I moved the flow of the continuum, everything around me would be changed—including not only the computer's memory, but my own.

Still, he scanned the news media and the educational channels of hundreds of TV stations all around the world that he orbited. Nothing appeared out of place. All was normal. His experiment had not changed anything. He still had the wasting immunodeficiency disease that his mother had bequeathed him. His body was still rotting away.

He thought of bringing the puppy and killing it with a painless gas, to see what effect the change would make on history. But he feared to tamper with the space-time continuum until he actually had Yamamoto in his grasp. He wondered idly if he could kill the puppy, then told himself angrily that of course he could; the dog must be long dead by now, anyway.

He knew he was ready for the climax of his experiments: snatching Yamamoto from nearly a century in the past. The time for hesitation is past, Konda told himself sternly. Set up the experiment and do it, even if it destroys this world and everything in it.

So he did. Making arrangements for the necessary power from Greater Nippon Electric took longer than he had expected: blacking out most of Asia for several hours was not something the corporate executives agreed to lightly. But at last they agreed.

As a final step in his preparations he asked the commander of the space station to increase its spin so that his isolation area would be at almost a full Earthly gravity.

"Will that not be uncomfortable for you?" the station commander asked. She was new to her post, the first woman to command one of Japan's giant orbiting stations. She had been instructed to take special care of the guest in the isolation module.

"I am prepared for some inconvenience," Konda replied to her image in his comm screen. He was already seated in his powered wheelchair. The low-g of the station had allowed him to move about almost normally, despite the continued atrophy of his limbs. His body spent most of its energy continually trying to destroy the fast-mutating viruses that were, in their turn, doing their best to destroy him. The lifelong battle had left him pitifully weak and frail—in body. But he had the spirit of a true samurai. He followed the warrior's path as well as he was able.

In truth he dreaded the higher gravity. He even feared it might put such a strain on his heart that it would kill him. But it was a risk he was prepared to take. Yamamoto would find his sudden emergence into the twenty-first century startling enough; there was no need to embarrass him with a low-gravity environment that might make him physically ill or overwhelm his spirit with sudden fear.

The moment finally arrived. The great power satellites turned their emitting antennas to the huge receiver that had been built near the space station. Half of Asia, from Beijing to Bangkok, went dark.

Grand Admiral Isoroku Yamamoto, commander in chief of the Japanese Imperial Fleet, suddenly appeared in the middle of Konda's living quarters. He had been seated, apparently, when the wave harmonics had transported him. He plopped unceremoniously onto the floor, a look of pain and surprise widening his eyes. Konda wanted to laugh; thank the gods that the field included the admiral's flawlessly white uniform. A naked Yamamoto would have been too much to bear.

Konda had divided his living quarters in two with an impervious clear plastic wall. Both sides were as antiseptic as modern biotechnology could make them. Yamamoto, coming from nearly a hundred years in the past, was undoubtedly carrying a zoo of microbes that could slay Konda within days, if not hours.

For a frozen instant they stared at each other: the admiral in his white uniform sitting on the floor; the scientist in his powered wheelchair, his face gaunt with the ravages of the disease that was remorselessly killing him.

Then Yamamoto glanced around the chamber. He saw the banks of gauges and winking lights, the gleaming robots standing stiffly as if at attention, the glareless light panels overhead. He heard the hum of electrical equipment, smelled the mixed odors of laboratory and hospital.

Yamamoto climbed to his feet, brushing nonexistent dust from his jacket and sharply-creased trousers. He was burly in build, thickset and powerful. His heavy jaw and shaved scalp made him look surly, obtuse. But his eyes gleamed with intelligence. Two fingers were missing from his left hand, the result of an accident during the battle of Tsushima, young ensign Yamamoto's first taste of war.

Konda bowed his head as deeply as he could in his wheelchair and hissed with respect.

Yamamoto granted him a curt nod. "I am dreaming," he said. "This is a dream."

"No, this is not a dream," said Konda, wheeling his chair to the clear partition that divided the room. "This is reality. You, most revered and honored admiral, are the first man to travel through time."

Yamamoto snorted with disdain. "A dream," he repeated. But then he added, "Yet it is the most unusual dream I have ever had."

For hours Konda tried to convince the admiral that he was not dreaming. At times Konda almost thought he was dreaming himself, so powerful was Yamamoto's resistance. Yet he persisted, for what Konda wanted to do depended on Yamamoto's acceptance of the truth.

Finally, after they had shared a meal served by the robots and downed many cups of *sake*, Yamamoto raised a hand. On the other side of the partition, Konda immediately fell silent. Even through the plastic partition he could feel the power of Yamamoto's personality, a power based on integrity, and strength, and limitless courage.

"Let us arrange a truce," Yamamoto suggested. "I am willing to accept your statements that you have created a time machine and have brought me here to the future. Whether I am dreaming or not is irrelevant, for the time being."

Konda drew in a breath. "I accept the truce," he said. It was the best that he would get from the utterly pragmatic man across the partition.

He felt terribly weary from trying to convince the admiral of the truth. He had deliberately wrapped his entire module in a stasis field, making it a small bubble of space-time hovering outside the normal flow of time. He wanted true isolation, with not even a chance of interference from the space station crew or the doctors. He and Yamamoto could live in the module outside the normal time stream for days or even years, if Konda chose. When he was ready to turn off the field and the bubble collapsed, no discernible time would have elapsed in the real world. He would return himself to the instant the experiment began, and Yamamoto would return to his writing desk in 1941. Not even his three friends would know if the experiment had worked or not.

If his friends still existed when Konda ended the experiment.

They slept. The robots had prepared a comfortable cot for Yamamoto, and suitable clothing. Konda slept in his chair, reclined in an almost horizontal position. His dreams were disturbing, bitter, but he suppressed their memory once he awoke again.

Time within the windowless chamber was arbitrary; often Konda worked around the clock, although less and less as his body's weariness continued to erode his strength. When Yamamoto awoke, Konda began the admiral's history lessons. He had painstakingly assembled a vast library of microform books and videotapes about the events of the past century. Konda had been especially careful to get as many tapes of boastful American films from the World War II years. This would be a delicate matter, he knew, for he intended to show Yamamoto his own death at the hands of the murderous Yankees.

Slowly, slowly Konda unreeled the future to his guest. Yamamoto sat in stolid silence as he watched the attack on Pearl Harbor, muttering now and then, "No aircraft carriers at anchor. That is bad." And later, "Nagumo should have sent in a third attack. The fool."

By the time the viewing screen at last went dark, Yamamoto looked through the partition toward Konda with a new look in his eyes. He is beginning to believe me, Konda told himself.

"This dream is very realistic," the admiral said, his voice dark with concern.

"There is more," Konda said. Sadly, he added, "Much more."

Konda lost track of time. The two men ate and slept and watched the ancient tapes. Yamamoto put away his uniform, folding it carefully, almost reverently, and wore the comfortable loose kimonos that Konda had provided for him. The admiral had far more energy and endurance than Konda. While the scientist slept the admiral read from the microform books. When Konda awakened Yamamoto always had a thousand questions waiting for him.

He truly believes, Konda realized. He sees that this is not a dream. He knows that I am showing him his own future. The admiral watched the disastrous battle of Midway in stoic silence, his only discernible reaction the clenching of his heavy jaw whenever the screen showed a Japanese ship being sunk.

To his surprise, Konda felt enormous reluctance when it came time to show Yamamoto his death. For a whole day he showed no further videos and even cut off the power to the mircroform book reader.

"Why have you stopped?" Yamamoto asked.

From behind his impermeable plastic screen, Konda grimaced with pain. But he tried to hide it by asking the older man, "Do you still believe that all this is a dream?"

Yamamoto's eyes narrowed into an intense stare. "All of life is a dream, my young friend."

"Or a nightmare."

"You are ill," said the admiral.

"I am dying."

"So are we all." Yamamoto got to his feet, walked slowly around his half of the room. In his dark blue kimono he needed only a set of swords to look exactly like a samurai warrior of old.

Slowly, haltingly, Konda told him of his disease. The gift of his unknown parents. He had never spoken to anyone about this in such detail. He cursed his whore of a mother and damned the father that had undoubtedly spread his filth to many others. An American. He knew his father had to be an American. A tourist, probably. Or a miserable businessman come to Tokyo to ferret out the secrets of Japanese success.

He railed against the fate that kept him confined inside a diseased body and kept the dying body confined inside this chamber of complete exile. He raged and wept in front of the man he had plucked from the past. Not even to his three best friends had he dared to speak of the depth of his hatred and despair. But he could do it with Yamamoto, and once he started, his emotion was a torrent that he could not stop until he was totally exhausted.

The older man listened in silent patience, for many hours. Finally, when Konda had spent his inner fury and sat half dead in his powered chair, Yamamoto said, "It does no good to struggle against death. What a man should seek is to make his death meaningful. It cannot be avoided. But it can be glorious."

"Can it?" Konda snapped. "You think so? Your own death was not glorious; it was a miserable assassination!"

Yamamoto's eyes flickered for an instant, then his iron self-control reasserted itself. "So that is what you have been hiding from me."

Almost snarling with searing rage, Konda spun his chair to the console that controlled the video screen.

"Here is your glorious death, old man! Here is how you met your fate!"

He had spent years collecting all the tapes from libraries in the United States and Japan. Most of the tapes were recreations, dramatizations of the actual events. Yamamoto's decision to visit the front lines, in the Solomon Islands, to boost the sagging spirits of his men who were under attack by the Americans. The way the sneaking Americans broke the Japanese naval code and learned that Yamamoto would be within reach of their longest-range fighter planes—for a scant few minutes. Their decision to try to kill the Japanese warrior, knowing that his death would be worth whole battle fleets and air armadas. The actual mission, where the American cowards shot down the plane that carried Grand Admiral Isoroku Yamamoto, killing him and all the others aboard.

The screen went dark.

"If your flight had been late by five minutes," Konda said, "the Americans would have had to turn back and you would not have been murdered."

The admiral was still staring at the blank screen. "I have always been a stickler for punctuality. A fatal flaw, I suppose."

Yamamoto sat silently for a few moments, while Konda wondered what thoughts were passing through his mind. Then he turned to face the younger man once more. "Show me the rest," he said. "Show me what happened after I died."

Still seething with anger, Konda unreeled the remaining history of the war. The Imperial Fleet destroyed. The home cities of Japan firebombed. The kamikaze suicide attacks where untrained youths threw away their lives to no avail. The ultimate horror of Hiroshima and Nagasaki. The humiliating surrender signed aboard an American battleship in Tokyo harbor.

The robots offered meals at their preprogrammed times. Neither Konda nor Yamamoto ate as they watched the disastrous past unfold on the video screen, defeat and slaughter and the ultimate dishonor.

"Does Japan still exist?" the admiral asked when the screen finally went blank. "Is there an emperor still alive, living in exile, perhaps?"

Konda blinked. "The emperor lives in his palace in Tokyo. Japan not only exists, it is one of the richest nations on Earth."

For the first time Yamamoto looked confused. "How can that be?"

Reluctantly, grudgingly, Konda showed the old man more recent history tapes. The rise of Japan's industrial strength. Japan's move into space. Yamamoto saw the Rising Sun emblem on the Moon's empty wastes, on the red deserts of Mars, on the giant factory ships that plied among the asteroids, on the gleaming Solar Power Satellites that beamed electrical power to the hungry cities of Earth.

At last the admiral rubbed his eyes and turned away from the darkened screen.

"We lost the war," he said. "But somehow Japan has become the leading nation of the world."

Konda burst into a harshly bitter laughter. "The leading nation of the world? Japan has become a whore! A nation of merchants and tradesmen. There is no greatness in this."

"There is wealth," Yamamoto replied drily.

"Yes, but at what price? We have lost our souls," Konda said. "Japan no longer follows the path of honor. Every day we become more like the Americans." He almost spat that last word.

Yamamoto heaved a heavy sigh. Konda tapped at the control console keypad again. The video screen brightened once more. This time it showed modern Japan: the riotous noise and flash of the Ginza, boys wearing Mohawk haircuts and girls flaunting themselves in shorts and halters; parents lost in a seductive wonderland of gadgetry while their children addicted themselves to electronic and chemical pleasures; foreigners flooding into Japan, blackening the slopes of Fujiyama, taking photographs of the Emperor himself!

"My father was one of those American visitors," Konda said, surprised at how close to tears he was again. "A diseased, depraved foreigner."

Yamamoto said nothing.

"You see how Japan is being destroyed,'' Konda said. ''What good is it to be the world's richest nation if our soul is eaten away?''

''What would you do?''

Konda wheeled his chair to the plastic partition so close that he almost pressed his face against it.

''Go back to your own time,'' he said, nearly breathless, ''and win the war! You know enough now to avoid the mistakes that were made. You can concentrate your forces at Midway and overwhelm the Americans! You can invade the west coast of the US before they are prepared! You can prevent your own assassination and lead Japan to victory!''

The admiral nodded gravely. ''Yes, I could do all of those things. Then the government that launched the war against America would truly dictate surrender terms in the White House—and rule much of the world afterward.''

''Yes! Exactly!''

Yamamoto regarded the younger man gravely through the clear plastic partition. ''But if I do that, would that not change the history that you know? Such a Japan would be very different from the one you have just shown me.''

''Good!'' Konda exulted. ''Excellent!''

''Your parents would never meet in such a world. You would never be born.''

Konda gave a fierce sigh of relief. ''I know. My miserable existence would never come to be. For that I would be glad. Grateful!''

Yamamoto shook his head. ''I have sent many warriors to their deaths, but never have I deliberately done anything that I knew would kill one certain individual.''

''I can follow the warrior's path,'' Konda said, barely able to control the trembling that racked his body. ''You are not the only one who can live by the code of bushido.''

The older man fell silent.

''I want to die!'' Konda blurted. ''I want to have never been born! Take my life. Take it in exchange for your own. For the greatness of Japan, you must live and I must never have come into existence.''

''For the greatness of Japan,'' Yamamoto muttered.

They ate a meal together, each of them on his own side of the partition, and then slept. Konda dreamed of himself as one of the kamikaze pilots, a head band proclaiming his courage tied across his forehead, a ceremonial sword strapped to his waist, diving his plane into an American warship, exploding into a blossom of fire and glory.

He woke to find himself still alive, still dying slowly.

Yamamoto was back in his stiff white uniform. The old man knew that his time here was drawing to its conclusion.

With hardly a word between them, Konda directed the admiral to the spot in the room where the wave harmonics converged. Yamamoto stood ramrod straight, hands balled into fists at his side. The generators whined to life, spinning up beyond the range of human hearing. Konda felt their power, though; their vibrations rattled him in his chair.

Only seconds to go. Konda forced himself to his feet and brought his right hand to his brow in a shaky salute to Japan's greatest warrior. Yamamoto solemnly saluted back.

''Go back and win the war,'' Konda

said, his voice shaking with emotion.

Yamamoto muttered something; Konda could not quite hear the words, he was too intent on watching the display screens of his equipment.

The admiral disappeared. As suddenly as a light blinking out, one instant he was there staring solemnly at Konda, the next he was gone back to his own time.

"Banzai," Konda whispered.

His finger hovered, trembling, over the key that would break the stasis and return him to the mainstream of spacetime. If all has gone well, this will be the end of me. Saito Konda will no longer exist. He pulled in a deep, final breath, almost savoring it, and then leaned savagely hard on the key.

And nothing happened. He blinked, looked around. His chamber was unchanged. His equipment hummed to itself. The display screens showed that everything was quite normal. The comm unit was blinking its red message light.

A terrible fear began to worm its way up Konda's spine. He called out to the comm unit, "Respond!"

The station commander's face took form on the screen. "When will you begin your experiment, sir?" she asked.

Konda saw the digital clock numbers on the screen: hardly ten seconds had passed since he had first put his chamber in stasis.

"It didn't work," he mumbled. "It's all over for now. You can return my module to the low-gravity mode."

The commander nodded once and the screen went dark. Konda felt a lurch in the pit of his stomach and then a sinking, falling sensation. He floated up out of his chair like a man in a dream.

Was I dreaming? he asked himself. Did it actually happen? Why hadn't the world changed? Why am I still alive?

Puzzled, almost dazed, he activated the tape rewind of the cameras that had recorded every instant of his experiment. When the recorder stopped, he pressed the PLAY button.

And there was Yamamoto in the chamber with him. Konda stared, put the tape in fast forward. Their voices chittered and jabbered like a pair of monkeys, they sped through their days together in a jerky burlesque of normal movement. But it was Yamamoto. It had really happened.

Konda sank onto his bed, suddenly so totally exhausted that he could not stand even in the low gravity. The experiment had worked. He had shown Yamamoto everything and sent him back to win his war against the Americans and save Japan's soul. Yet nothing seemed changed.

He wanted to sleep but he could not. Instead, in a growing frenzy he began to tune in to television broadcasts from Earth. One channel after another, from Japan, China, the Philippines, Australia, the United States, Europe. Nothing had changed! The world was just the way it had been before he had snatched Yamamoto out of the past.

Konda beat his frail fists on his emaciated thighs in utter frustration. He tore at his hair. Why? Why hasn't anything changed?

Frantically he searched through his history tapes. It was all the same. The war. Japan's defeat. The humiliation of achieving world economic power at the sacrifice of all that the Japanese soul had held dear in earlier generations.

I still live, Konda cried silently. My

mother was born and grew up and plied her filthy trade and gave birth to a diseased, unclean son.

In desperation, he went back to the tapes of Yamamoto's assassination. It was all the same. Either the experiment had not worked at all, and Konda had hallucinated his days with Yamamoto, or . . .

He saw one thing on one of the tapes that he did not recall being there before. The screen showed the twin-engined plane that would carry the admiral and his staff from the base at Rabaul to the island of Bougainville. The narrator pointed out Yamamoto's insistence on punctuality, " . . . as if the admiral knew that he had an appointment with death."

A moment or two later, while the screen showed American planes attacking the Japanese flight, the narrator quoted Yamamoto as saying, "I have killed many of the enemy . . . I believe the time has come for me to die, too."

"He did it deliberately!" Konda howled in the emptiness of his chamber. "He knew and yet he let them kill him!"

For hours Konda raved and tore through his quarters, pounding his fists against the walls and furniture until they bled, smashing the equipment that had fetched the greatest warrior of history to his presence, raging and screaming at the blankly immobile robots.

Finally, totally spent, bleeding, his chest heaving and burning as if with fever, he sat in the wreckage of his laboratory before the one display screen he had not smashed and called up the tape of Yamamoto's visit. For hours he watched himself and the doughty old admiral, seeking the answer he desperately needed to make sense out of his universe.

He should have gone back and changed everything, Konda's mind kept repeating. He should have gone back and changed everything.

For days he sat there, without eating, without sleeping, like a catatonic searching for the key that would release him.

He came to the very end of the tape, with Yamamoto standing at attention and gravely returning his own salute.

He heard himself say to the admiral, "Go back and win the war."

He saw Yamamoto's lips move, and then the old man disappeared.

Konda rewound the tape and replayed that last moment, with the sound volume turned up high enough to hear the admiral's final words.

"Go back and win the war," his own voice boomed.

Yamamoto replied, "We did win it."

Haggard, breathless, Konda stared at the screen as the old admiral disappeared and returned to his own time, his own death. Willingly.

Tears misted his eyes. He went to his powered chair and sank wearily into it. Yamamoto did not understand anything. Not a thing!

Or perhaps he did. Perhaps the old warrior saw and understood it all. Better than I have, thought Konda. He sees more clearly than I do.

In the warrior's code there is only one acceptable way for a man to deal with the shame of defeat. Konda leaned his head back and waited for death to take him, also. He did not have to wait very long. ■

Geoffrey A. Landis

THE DEMON UNDER HAWAII

A Mystery Under the Earth

I'm wrong. At least, I think I'm wrong. Or, anyway, I hope I am.

Bear with me. What I'm about to tell you may seem a bit farfetched, but, as Sherlock Holmes once explained, once you've eliminated the impossible, whatever explanation remains, however ridiculous, must be correct.

Or something like that.

OK. First question. Does Hawaii bother you? It bothers the heck out of me. If it doesn't bother you, maybe you're not worrying about it hard enough. A chain of islands, seventy million years old, right smack in the middle of the Pacific plate—

Stop right there. Let's go back and start at the beginning. This is gonna take a lot of explaining.

Anybody who owns a globe quickly notices that the coastlines of Africa and South America fit together like interlocking pieces of a jigsaw puzzle. This is not news; in fact, the old English philosopher Francis Bacon remarked on this fact back in 1620, suggesting that the match was "no mere coincidence." For hundreds of years, though, the established wisdom was that it *was* mere coincidence, since nobody could come up with a good suggestion as to how millions of square miles of continent might move a thousand miles across an ocean. From time to time various crackpots suggested exactly this notion, but nobody gave them any serious hearing.

In 1908, Frank Taylor, an American geologist who studied mountains, made the extraordinary suggestion that the continents actually do move, floating horizontally on the viscous mantle in a "mighty creeping movement." The mountain ranges of Earth, he suggested, were created where the crust buckled and dented in titanic collisions between continents. His ideas were politely listened to, politely ignored, and just as politely forgotten.

Three years later, a German meteorologist and explorer ignited worldwide controversy by suggesting the same thing. Unlike the quiet American geologist, Alfred Wegener was too insistent to be ignored, and too persistent to go away—although many geologists of the time wished he would. They could, however, ridicule him. And did.

Wegener was the very ideal of the Campbellian scientist hero. He was both an explorer and a theorist with wide-ranging interests and no respect for the artificial divisions between scientific disciplines. He was a respected authority in his own field, willing to make bold leaps of imagination, yet calm in the face of contempt from the scientific establishment. Based on his own exploration in Greenland and on geological and biological evidence in South America, Africa, and Europe, he suggested that the four continents were once united, and thus that continents could, and did, move.

Wegener, unfortunately, made one big mistake. He proposed that the North American continent was moving away from Europe at the astonishing speed of over a hundred feet per year. This was unfortunate, because such a rate of motion was high enough that it could be detected even by the crude geodetic measurements of the time. The measurements proved Wegener wrong: to the best measurement accuracy of the time, the continents were fixed in place.

Wegener was not a sit-at-home theorist. He died on his third scientific expedition to Greenland, the harsh and beautiful land that he loved. On a rescue expedition to deliver supplies to stranded colleagues at a winter camp, he was caught in a blizzard. The rescue was a success—the colleagues survived a winter on the glacier—but Wegener never returned. The relief expedition in the spring found his body on the glacier. Nobody spoke ill of him after his death—his accomplishments in other fields commanded respect, and his crackpot ideas of the Earth moving could at last fade into obscurity. Even great minds, they said, sometimes have their flaws.

It was 30 years before another scientist, Harry Hess, again proposed that the Atlantic Ocean might be widening. The true rate, measured much much later by laser geodesy, was a bit over an inch a year.

It would take a much longer essay to describe the long slow process of observations that forced geologists to abandon everything they thought they knew, to accept the heretical theory of continental drift. It took thousands of measurements, of things as diverse as the thickness of the sediment on the ocean floors and the layers of magnetism frozen into volcanic rocks; each observation another nail to hold together a new scientific framework: the theory of geology called plate tectonics.

One of the nails was the peculiar chain of islands that we call Hawaii.

The mantle—the thick rock that makes up the bulk of the Earth, between the core and the crust—is hot viscous rock. It behaves something like Silly Putty, with the crust a cracked skin of solid material on top. This solid crust forms huge plates of material that float on the mantle like fractured sheets of ice floating in a harbor (the continents themselves are a scum of lighter rocks, like a layer of dirt on top of the ice sheets). The rock plates move very slowly, carried along on the slow motion of the mantle as if on conveyor belts. Rock from the deep mantle of the Earth rises at the mid-ocean ridges, where new crust is forming, and then plunges back deep into the Earth in deep trenches called subduction zones.

Earthquakes and volcanoes come at these types of sites, either where new crust is being formed, or old crust being buried, or at sites where two tectonic plates slide against each other.

Hawaii, however, is not near the mid-ocean ridge where new crust is being formed; nor is it near the subduction zones where old ocean crust is recycled back into the depths of the Earth. It is not at a plate boundary at all—it is located smack in the middle of the Pacific plate.

There's more to the Hawaii that you see on a map. The islands form a chain of peaks nearly three thousand miles long. West of Midway Island, the tips of the mountains are under water. You can't see them from the surface, but they are there, a chain of undersea mountains that extends across the Pacific right to the edge of Siberia. Every single one of them is an old volcano. The easternmost member is the big island of Hawaii, an active volcano. The next is Oahu, no longer quite so actively bubbling, but still a hot volcano. Moving westward and north the volcanoes are extinct, and have been extinct for progressively longer periods as you look farther west; the westernmost seamounts are volcanoes that have been extinct for seventy million years.

The explanation—suggested by scientist Tuzo Wilson, from the University of Toronto, in 1963—is that these volcanoes mark the thermal plume from a "hot-spot" deep under the Earth under the center of the Pacific plate. The Pacific plate is only sixty miles or so thick, and as it moves, the hot spot remains in the same position, burning a hole through the crust immediately above it. The trail of ancient and extinct volcanoes thus maps out the reverse of the movement of the plate above the stationary hot-spot. The line of volcanic islands, from extinct to active, is a map of plate tectonics in action.

OK so far? Now here's the question: what causes the hot-spot?

The answer is clear, say the geologists. All of the Earth's interior heat comes from radioactivity. Thus, the hot-spots must be heated by radioactive decay.

But why a hot-spot? And, why a hot-spot that has remained in place for tens of millions of years? The continents themselves have moved thousands of miles; the mantle material is a viscous liquid, but the hot-spot hasn't dispersed, hasn't moved.

A concentration of radioactive material?

Well, it's not out of the question. There are radioactives in the Earth's crust, and they do get concentrated by geological processes. Sometimes deposits even go critical—in fact, there is a natural uranium reactor in the African Rift Valley that has been going at a low level for a few million years, moderated by seepage of ground water. (This nuclear reactor has been going, roughly, for the same amount of time that humans have been evolving, and in about the same place. Do you think—? Nah, probably not.)

But just how much heat are we talking about here? The hot-spot under Hawaii is a radioactive source that makes mere atomic bombs look like flashbulbs. Only a minute fraction of the heat makes it to the surface in the form of lava. We're talking billions of tons of mantle rock, heated to nearly melting, rising through the crust each year. This is one big-time energy source.

I'll tell you what I think it is. It's the nuclear reactor of a crashed alien spaceship.

OK, it sounds crazy, but it makes a

certain kind of sense. I know, you've all seen this in old science fiction stories. I know what you're thinking. Sixty miles under the crust of the Earth? The pressure is 10,000 atmospheres, and it's 1,000°C down there. A spaceship would have been crushed and melted.

OK. A crushed and possibly melted interstellar spacecraft is buried 60 miles under Hawaii. And it's been there for the last seventy million years.

What We Know About Interstellar Flight

Interstellar?

Stands to reason, doesn't it? After all, classic science fiction stories notwithstanding, we know now that the Solar System outside of the Earth is no fit abode for life. Venus is broiling. Mars has only traces of air, and the gas giant planets, if they were somehow to spawn life, would develop some strange and aerial form of life that would have not the slightest interest in visiting Earth.

But the real reason we know it must be an interstellar spaceship is simply the amount of energy. After *seventy million years,* this power plant is still putting out tremendous, prodigious, ridiculous, I mean, *gigantic* amounts of energy. We are talking one heck of a power source here, folks. It takes energy to travel to Mars, sure, but not *that* much.

But it does take a heck of a lot to travel between stars.

Science fiction readers seem to have this peculiar belief that Einstein must be wrong. Faster-than-light travel must certainly be possible, even easy: if it wasn't, the Universe wouldn't be *interesting*. There wouldn't be any *stories*. A thousand experimental confirmations of special relativity? Why bother thinking about the evidence, if you already know that relativity must be wrong?

Wishful thinking. The Universe is what it is, not what SF writers would like it to be. The funny thing about old Albert—the more we look, the more right he seems to be.

But, no crying. Even with a speed limit, the Universe is still interesting. By the miracle of relativity, in fact, it's possible to get to the nearby stars in a few years, and just about any star in the Galaxy in a human lifetime.

Time slows down as you approach the speed of light. If you accelerated at one gee, in a year (your time) you'd reach 77% of the speed of light. Time, for you, would be running about a third slower than time for the stay-at-homes. In four years you'd be over 99.9% of the speed of light, and time would be slowed down by a factor of 30.

If you accelerated at one gee half the way, and then decelerated at one gee the rest of the way (you wouldn't want to pass by at 98% of the speed of light, would you?), you could get to Alpha Centauri in under four years. (Actually it makes more sense for you to coast in the middle. No sense in accelerating right up to the moment you slam on the brakes.)

You just need enough energy.

A heck of a lot of energy.

Even using $E = mc^2$ it's *still* a heck of a lot of energy. You can't do this with an ordinary nuclear pile. Not even with fusion. Fusing hydrogen to helium turns slightly under 1% of what you start with into energy (0.717%, actually). This is pretty good by your ordinary day-to-day standards—you can vaporize cities with less—but not very good by the standards of a starfaring civilization.

The problem is, you just need too much fuel. A perfect fusion rocket would eat its weight in fuel in a month. If you start extrapolating that forward to an engine that has to run for years, it's just out of the question. The fuel to carry the fuel—and the fuel to carry *that* fuel, and so on—just eats your lunch. You end up having to carry all fuel and no payload.

You need something better.

Fortunately, something better is available. You need antimatter.

Antimatter is real, all right, although for obvious reasons there's not a whole lot of it lying around. Antimatter is the quantum inverse of normal matter; every quantum number (except mass) is exactly opposite to the ordinary everyday matter you see around you. Instead of protons and neutrons, there are antiprotons and antineutrons; instead of electrons, positrons. Take a gram of antimatter, annihilate it with a gram of regular matter, and *all* of it turns to energy. Or, more precisely, turns into pions, neutrinos, and gamma rays, plus the odd smattering of muons and other garbage. All of which, except the neutrinos, can be ultimately turned into energy (in principle, anyway). Total conversion, in a handy, easy to carry package.

Easy to carry? Not quite.

How do you carry antimatter in a spaceship made out of matter?

Did I hear somebody say magnetic fields? Good; I see that you've been studying. Electric fields? Right again, another good choice—charge it up and suspend it in vacuum.

These all have problems, of course: if something goes wrong, if your magnetic bottle leaks just a *little* bit, or your control system falters for a fraction of a second, you don't have a spaceship any more. You've got a large ball of very hot plasma, expanding at very near to the speed of light. This is a problem.

How much antimatter do you need, anyway? For that trip to Alpha Centauri, for every gram you take you need one and a half grams of antimatter (see side bar). That's if you could use the antimatter with perfect efficiency. And how big is your spaceship? With coasting, it's a six-year journey each way. Maybe you take, what, a few dozen people? A life-support system to keep everybody alive and happy for 12 years plus whatever time you spend there? Say a thousand tons of spaceship, loaded weight not including fuel? That's a pretty small spaceship, all things considered. The space shuttle, empty weight, runs about that much.

Filling it up with Super

Calculating speed and fuel consumption for your interstellar spaceship

How much antimatter do you need for your interstellar spaceship? Well, that depends on how fast you want to go, and how efficiently you want to burn your fuel. (Here's where I get to use equations. What? Don't like equations? Then quit reading this sidebar and go back to the main article. No problem.)

Now: everybody knows that one gram of antimatter annihilates one gram of matter, so the best mixture ratio must be one to one, right?

Turns out it's not always that simple. One-to-one mixture ratio gives you the highest amount of energy per unit of mass burned, but not the most efficient use of antimatter. Antimatter is an expensive resource, while the ordinary matter you use to annihilate it with is common. It makes sense, then, to burn *lots* of regular matter with as little antimatter as you can get away with.

If you could burn matter and antimatter at a mixture ratio of one to one, and use all of the resultant energy, the exhaust would be a stream of photons, traveling at the speed of light. Add in extra matter, though, and—if you can absorb all the energy—the exhaust velocity is less than the speed of light. So: what's the best exhaust speed?

Turns out the answer's simple. The optimum exhaust (for energy efficiency) is when the speed exactly equals the rocket's delta-vee (that means, the exhaust speed equals your speed, if you're accelerating). Why? Simple. If you exhaust gas *backwards* at a speed just equal to your ship's speed *forward*, your exhaust doesn't have any kinetic energy (relative to the universe at large, that is). So all of the energy you get from burning the fuel must go to adding to the ship's energy. No way to do better than that.

Well, then, Ready for some equations?

The energy that you get from annihilating a mass of antimatter is

$$E = 2m_{antimatter}c^2 \qquad (1)$$

Why the factor of 2? Because one gram of antimatter plus one gram of normal matter to annihilate with it means *two* grams of matter turn into energy.

Now if your ship is traveling at a speed v, its kinetic energy is

$$E = (\gamma - 1)m_{ship}c^2 \qquad (2)$$

Gamma (γ) is an old friend from your introduction to relativity course, the relativistic time dilation factor:

$$\gamma = (1 - v^2/c^2)^{-1/2} \qquad (3)$$

Sorry it's complicated. I didn't make this up. So if you end up with a ship going a velocity v, set these two equations equal and you've found how much antimatter you must have needed to get going that fast:

$$m_{antimatter} = (\gamma - 1)/2m_{ship} \qquad (4)$$

No problems, OK? You just need to know gamma, which means you need to know the velocity. For simplicity let's measure acceleration in gravities and time in years measured on ship. Then if you accelerate at constant acceleration g (ship's frame), for a time t, at the end of that time you're traveling at a velocity of

$$v = c \tanh(1.034\ gt) \qquad (5)$$

1.034 happens to be the acceleration of gravity in light-speeds per year. Tanh means hyperbolic tangent. If you've got a fancy enough calculator it might have a key for this. If you know your sinhs and coshs, I bet you can simplify equation (3), too, right?

$$\gamma = 1/\cosh(1.034\ gt) \qquad (6)$$

But wait. Not so fast. You probably want to stop, too. You'll need to decelerate for just as long as it took to get going in the first place. How much antimatter does that take?—well, just exactly as much as if you accelerated for twice as long. (No, it turns out to be a bit more than twice as much antimatter.)

Let's take that vacation out to Alpha-C. We'll make it one year accelerating at one gee (reaching 77% of light-speed), coast for four years, then another year decelerating, six years total. Daisy-chaining the equations backwards, the required mass of antimatter you needed was 1.5 times the mass of your ship.

Not too bad. Unless you want to get home as well? You can probably pick up some normal matter while you're stopping over, but unless you happen to pick a vacation spot that has an antimatter factory, you'd better take the antimatter you need with you. Shipping out your ship plus the antimatter to return takes (2.5)(1.5) times your ship mass worth of antimatter, so the total amount of antimatter you must have started with was 5 times your ship's mass.

Heck, and that's just the low budget trip to Alpha Centauri. You want to take the grand tour, you *really* gotta bring some antimatter.

For completeness, I'll give you one more formula, and then you can make your own tour itineraries. The distance (in light-years) traveled under acceleration is:

$$d=[\cosh(1.034\ gt)-1]/g \qquad (7)$$

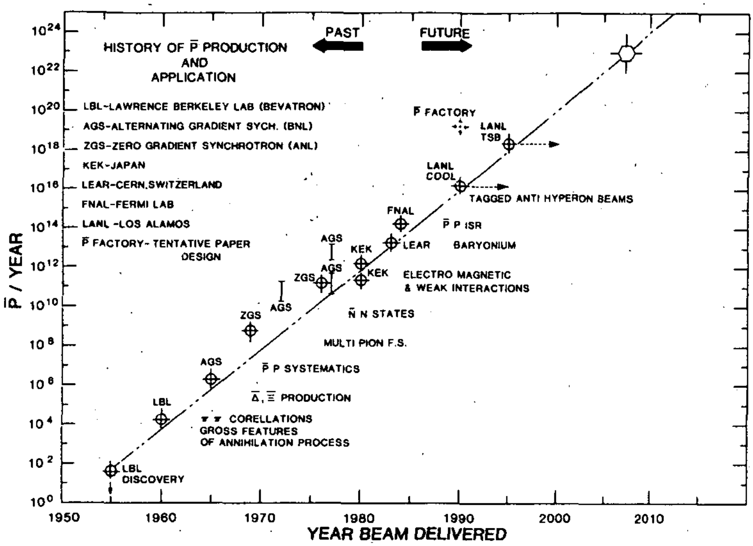
You're on your own now. Don't forget that gamma means time really flies when you've moving fast. Have fun.

OK. That's fifteen hundred tons of antimatter, plus the same amount of matter to annihilate it with. To get there. Another *four* of each again if you want to get back.

Your five thousand tons of antimatter represents the energy content of something like a hundred million atomic bombs.

Will we ever have enough energy to make antimatter in the needed quantities? The entire world power usage, if devoted exclusively to manufacturing antimatter with 100% efficiency, would produce less than a kilogram of antimatter per year. Looking back through history, we find that every 30 years or so the human race doubles its energy production capability. In other words, in the next 30 years we will use as much energy as we have used in all of human history. If that keeps up, in a thousand years we will have at our fingertips enough energy that every person now on the Earth could command as much power as the entire Earth uses now. The energy needed to manufacture the antimatter for a starship would represent only a tiny fraction of a year's power consumption.

Can we make antimatter? We can, and do, make antimatter now, in particle accelerators such as FermiLab—in quantities of picograms. From picograms to gigagrams is quite a jump. But if you look at the graph of the historical progress of antimatter production, you see that the acceleration in production capability is tremendous. Historically, the production capability for making antimatter has increased by a factor of ten every three years. If we can keep up this phenomenal rate of increase, we will have the technology to make starship-quantities of antimatter in well under a hundred years!



The historical production rate of antimatter since the discovery of the antiproton in 1955, plotted by M.V. Hynes of Los Alamos National Laboratory (from Howe and Metzger, *J. Propulsion* Vol. 5. No. 3, 1989.)

(Note: this figure is from a work by the U.S. government and not subject to copyright)

Or if not hundreds of years, thousands. Or hundreds of thousands. If history teaches us anything, it tells us that it is impossible to predict the future by projecting exponential growth based on the past. Technologies change; societies rise, change, and wither away. But *somewhere*, maybe thousands of light-years away, there may have been —people?—that have kept up the technology, met and crossed the barriers, and have learned to make antimatter starships without annihilating their civilization in the process.

But you still gotta do something about keeping the antimatter. Face it, a fuel tank where any little thing that goes wrong will turn you, your little dog, and anything within a million miles or so into gamma rays, just isn't cool. Think about all the troubles the nuclear power industry is having with plain old ordinary fission power plants, where if something goes wrong the thing doesn't even blow up, it just quietly melts. What you need is the equivalent of an "inherently safe reactor," one where when things start to go wrong, the reaction damps itself out.

The trick to storing antimatter is to never let an atom of antimatter (shall we call this an antiatom?) come in contact with an atom of regular matter.

Fortunately, there are, indeed, better things in store. So to speak. Maybe you can store antimatter in a crystal.

Designing Dilithium

Many metals can store hydrogen; the tiny little hydrogen atoms stick themselves neatly into the interstices between the metal atoms. Palladium, for example, easily holds two hydrogen atoms for every palladium atom. If metals can hold hydrogen, then why not antihydrogen? After all, antihydrogen is very much like hydrogen.

That's crazy, I hear you say. It's not much like hydrogen at all: antimatter *annihilates* when it touches ordinary matter; how can you store it inside a normal-matter crystal? Atoms touch each other in crystals; an antiatom would go *kapow!*

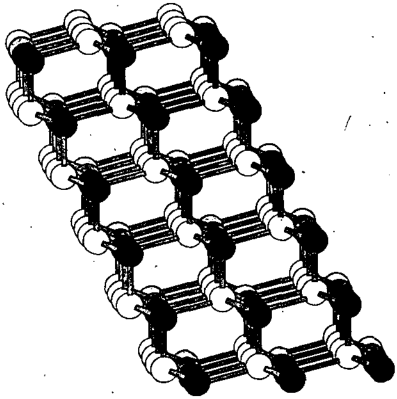
Well, think about it some more. While the *atoms* may touch each other in a crystal, the nuclei, the tiny kernels of mass at the center of the atom, are far apart—only the electron clouds touch. But an electron won't annihilate against an antiproton; it can only annihilate against an antielectron (or "positron"). So, if we have neutral antiatoms in a crystal, we'd have bad problems with the positrons. But if we just have bare antiprotons—anti-hydrogen ions—we could keep them far away from the normal matter nuclei. They'd be negatively charged, of course (since ordinary protons are positive, antiprotons are negative) but that's not a problem. We need a crystal structure that can hold negatively charged ions. *Lots* of crystals hold negatively charged ions. Sodium chloride, for example—ordinary table salt.

Alas, it's not so simple. The tricky part comes in keeping the negative anti-ions from being attracted to the positively charged nuclei of ordinary atoms. In an ordinary crystal, what holds atoms apart is something called the Pauli exclusion force. One electron can't occupy the same quantum state as another electron, so if you force two electrons close together, one or the other has to go into a higher energy state. This results in an effective force holding atoms apart—the electron clouds don't "like" to overlap. An antiproton, of course, has no such problem. In fact, there's a simple proof that says that there *is* no stable place to put an antiproton in a fixed crystal lattice.

But crystal lattices are not fixed. To put it more clearly, when you move the negative antiproton ions, the electrons in the crystal move too. All you have to do is design your crystal so that when the antiprotons in the crystal lattice move, the electrons move exactly in such a way as to push them back into place. Sounds farfetched, but actually, just such a mechanism makes superconductors work. So there.

So you can put antiprotons into a crystal lattice. Very interesting. What then? You gotta get them back out. And you better be able to get them back out without destroying the crystal lattice in the process.

Crystal lattices are funny things. You'd think that in ordinary matter like silicon or zeolite the atoms would be packed together tightly, but it turns out it's not quite so. You look at a crystal from one angle, and you see nothing but densely packed atoms, but turn it a little bit, and *ping!* you see big empty holes right through the crystal lattice. "Channels," we call them. Here's a schematic of the crystal lattice of a common semiconductor, gallium arsenide (it could just as well be indium phosphide or silicon or even diamond, which all have similar lattices). You can easily see the



Gallium arsenide crystal lattice. The open spaces between the atoms form long, straight "channels" through which energetic particles can travel without resistance.

big channels through the crystal. Funny thing about channels is that if you put an energetic particle down a channel, it's like a bowling alley—the particle zips right through the crystal, losing hardly any energy at all. (Yes, we call this effect "channeling." Really. Shirley MacLaine, listen up.) We can use this as a convenient way of getting antiprotons out of our crystal.

Thus, we need to design a crystal which keeps antiprotons stably in the lattice when you want them kept in place, and pops them neatly out through the crystal channels when you want to use them. It's a crazy idea, but it just might work. Just, how do you let the crystal know whether to hold onto the antiprotons or let them go?

The straightforward way to do this is to make your crystal change phase. In other words, we want not just one crystal, but two: one to hold antiprotons, and one to pop them loose. And then you need a way to change the crystal from one structure to the other on command.

Materials with the same composition but different crystalline structures are known as allotropes. Many materials have several allotropes. Carbon, for example, comes in two well-known forms, graphite and diamond, plus a few other lesser known versions. Ordinary water crystals—ice—come in half a dozen different crystal types, depending on pressure and temperature. Back to geology (remember this article was about geology?) the most important material of the Earth's mantle is a rock crystal called olivine, a magnesium-iron silicate. Olivine changes crystal structure from a low-density crystal with large holes between the atoms to a high-density crystal as the pressure is increased.

Now here comes the clever part. You make the crystal you want to hold antimatter *change structure with temperature*. Hot, the crystal forms itself into the structure that holds on to the antimatter. Cool it down, and it changes to the structure that lets the antimatter go free. Got it?

The system forms exactly the inherently safe reactor we want. If something starts to go wrong and the antimatter is being released too quickly, the crystal heats up, and the release rate slows down.

An Ancient Tragedy

And so we have all the pieces of the jigsaw puzzle. Put together, we can see the outlines of an ancient tragedy, although the details we will never know.

How far did they come? A hundred light-years? A thousand? Certainly life-bearing stars are not close together. Traveling at nearly the speed of light, they surely knew that they would never see the people they left behind. There's no reason to think that their ship has the mere seven thousand tons of antimatter like the small Alpha-Centauri cruiser we talked about earlier. Their ship must have been a self-contained small city big enough to bring all the comforts of civilization, whatever they may be.

They must have been intensely curious, these unknown strangers who long ago came to visit, to make such an immense journey. Probably their robot explorers had passed by first, to tell them that there was a world worth visiting, a fascinating planet with an incredible diversity of life; abundant, towering trees and enormous saurians, this Earth of seventy odd million years ago.

In a single starship they controlled far more energy than our entire civilization has used since the dawn of history. Their huge starship with its colossal crystalline antimatter engines would have never been designed to land. It would have carried with it lighters the size of our space shuttle—like mopeds strapped to the back of a Winnebago—to ferry them to and from the planetary surface. The starship, with its incredible load of antimatter for the return journey safe in crystalline matrices, would orbit overhead.

The starship was fueled for a round-trip journey, but they never made it home. Something went wrong.

The starship hit the Earth.

Maybe it crashed; maybe it soft-landed. Somehow the reactor broke free. It was designed to survive, remember; it would have been engineered to stay intact under the worst case accident. Free, and critical, hotter than molten rock and glowing with hard gamma radiation, it *melted* its way through the ocean floor. The cloud of steam must have been incredible; must have girdled the planet with clouds. Slowly it would have sunk into the rock, like a hot nail through butter; 10 miles deep, 20, 60, the pressure rising as it sank. At last it reached the edge of the mantle, where the denser mantle rock abuts the light crustal rock. Less dense than the mantle rock, it stopped, floating at the discontinuity; surrounded by molten rock under unimaginable pressure.

There's an antimatter reactor buried deep under Hawaii, big enough to power a starship in a journey across hundreds of light-years. All that we can see of it is the plume of molten rock rising like smoke from the critical reactor. Like a beacon, it's been burning holes through the crust for seventy million years, waiting.

And What Do We Do Now?

It's there, but how deep? Maybe as shallow as the Mohorovicic discontinuity only 60 miles under the surface, maybe at the mantle phase-change discontinuity as deep as 400 miles.

Thirty years ago—about the time that the ideas of continental drift belatedly began to gain some skeptical credence among geologists—there was a plan to drill a hole under the ocean, through the crust of the Earth into the edge of the Mantle. The project, dubbed "Mohole," was eventually cancelled by

Congress. But the technology for drilling deep holes continues to get better. Not this year, not next, but someday, we will have the capability to drill down under Hawaii and bring up the remains of an alien spaceship. There will be nothing left of the ship itself, of course. Likely it did not survive the crash; even if it did, the heat and pressure a hundred miles under the Earth would have crushed and melted it. But the antimatter reactor was made of tougher stuff. It was designed to survive, and has.

But what do we do when we recover it? We could build a starship with it, or at least use the engineering knowledge we can recover from it to build one of our own. But will we? Across history, what has always been the first large application of powerful, compact energy sources, like gunpowder or dynamite? Who can we trust with this? More energetic than volcanoes, this will be the greatest weapon of all time.

Perhaps as we learn to control antimatter, we also learn to control the equally powerful human impulses to use it to seek another kind of power, the power to impose our world view on others. But to have it handed to us, centuries, maybe millennia before we're ready. . . . The recovery of a single tremendous and compact source of antimatter, hundreds or thousands of years before we will have the capability of manufacturing it on our own . . . what will we do with it?

I'm afraid.

Of course, maybe I'm wrong.

We can only hope.■

References

S.D. Howe and J.D. Metzger, "Antiproton-Based Propulsion Concepts and the Potential Impact on a Manned Mars Mission," *J. Propulsion and Power, Vol. 3*, No. 3, pp. 295-300 (1989).

R.L. Forward and J. Davis Jr., *Mirror Matter*. Wiley, NY, 1987.

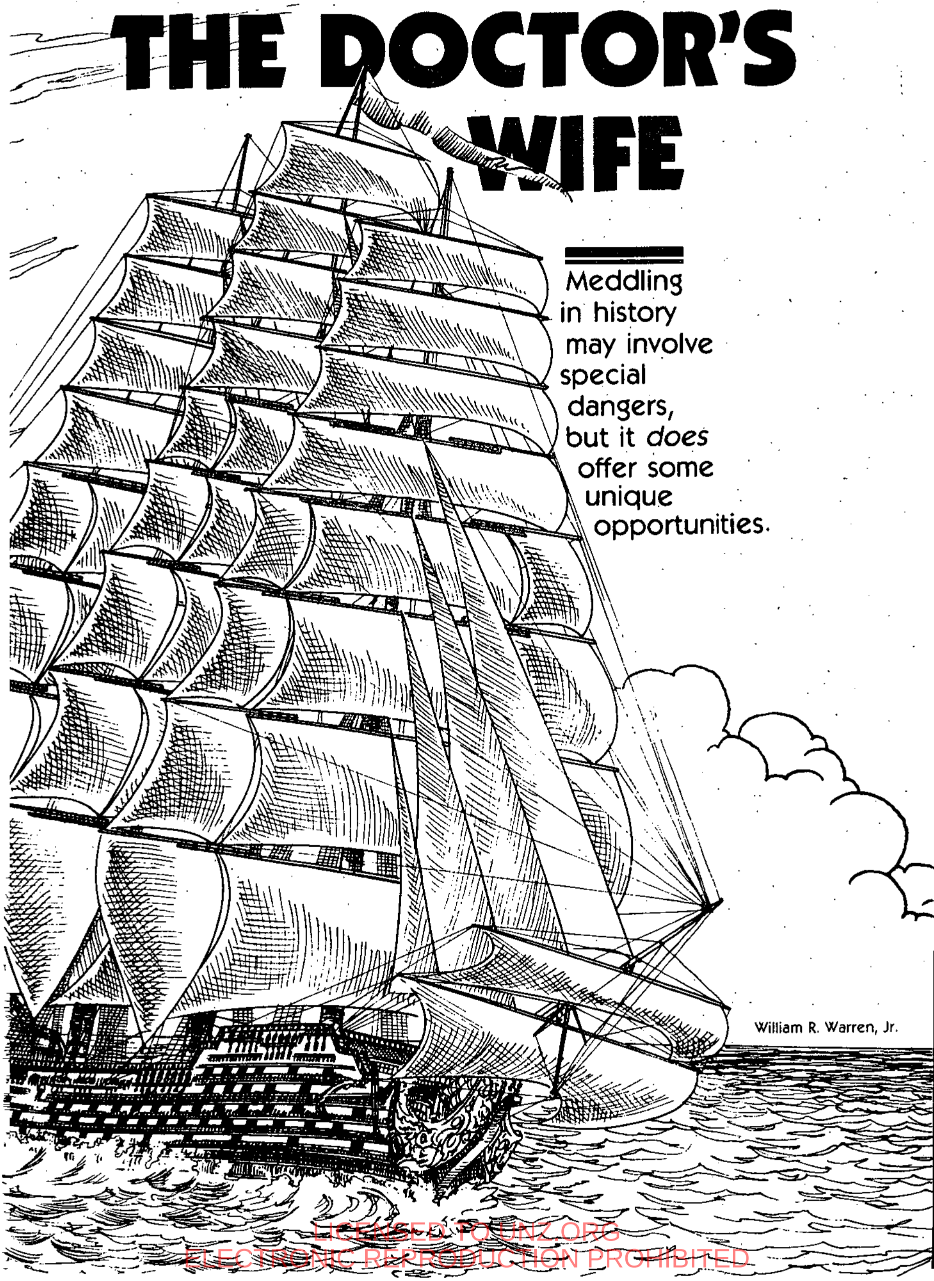
●We are never content with our lot; the worst time is always the present.

Jean de La Fontaine

Maya Kaathryn Bohnhoff

THE DOCTOR'S WIFE

Meddling in history may involve special dangers, but it *does* offer some unique opportunities.



William R. Warren, Jr.

My family has always gone down to the Sea in ships. I am told that the first Dunbar shipped out of Norway on a leaky Viking longship. Probably a stowaway. First of many. For some reason, Dunbars *like* being stowaways. The thrill of danger, perhaps, or obsessive curiosity or arrested development.

Not that I'm denigrating my ancestors. I'm no exception. I, too, hitch unauthorized rides on tall ships. The only difference between me and the other Dunbar riff-raff is that I get paid for it. That is, I have a grant, which amounts to the same thing.

I am not, and never have been a good student. I have gotten this far in my post-doctoral by the skin of my Celtic teeth. I do produce results. I do well at peer reviews. But I have this penchant for—shall we say—becoming involved with my subject matter. *Really* involved.

Case in point: My most recent project. Regency England. Commerce as a Tool of Imperialism. A broad area of study. Too broad, I thought, and narrowed it down to the British East India Company. Then I narrowed it down a little further to a ship named *Essex*.

Now the *Essex* was of particular interest for a number of reasons. One is that she was reputed to have carried more sails than any ship ever rigged—sixty-three in all. She also may have seen the first use of camouflage, having one side painted differently than the other so as to confuse privateers and French sea captains. Then there was her master, Captain Charles Dunbar—"Black Charley" Dunbar to the general public, many times great-grampa Charley to me.

When I arrived in London, it was winter 2115. A crisp, chill, unutterably beautiful, travel-poster day. I longed to spend time on the piers inhaling brine, but my Shift-Eye (aka Human Observer) was not in the mood to freeze his tush off while I pined for days when ships sailed *in* water instead of over it, and wind power was the *puissance du jour*. He hustled me and my Temporal Grid Enclosure (TeGrEn) quickly through check out.

QuestLabs advises Time Travelers not to carry unnecessary baggage. In my humble opinion, that's as good a description of a Shift-Eye as you're likely to find. Their function is ostensibly to assist in transporting and setting up equipment, monitor the Shift and the Traveler's vitals, and pull him or her back in case something goes wrong. In the thirty-five years since QuestLabs began Licensing the Temporal Shift Technology, so little has gone wrong that the Shift-Eye rarely does more than sit around drinking coffee and watching reruns of *Dr. Who* on SF-Net.

I'd shuttled my Grid to London, air freight, cleverly disguised as a shipping crate of the type used by the East India Company circa 1800. Brought it to the docks in an aero-lorry. That was actually cheaper than making a Trans-Atlantic Retrotemporal Shift, and I was trying to show a few Full Fellows that I could be frugal with QuestLabs' resources.

I Shifted at midday so as not to discomfit my Shift-Eye. I discomfited myself instead, arriving on the London docks (again) at midnight. It was late spring, 1805. The war with France was in full swing. Nelson was already a hero and was closing on immortality. The sea lanes were a shooting gallery. It was a dangerous time to be at sea on a British East Indiaman, which, I suppose, is why I wanted to be there. Call it a death-wish—I suspected my ancestor had similar cravings.

The TeGrEn's spatial interference detector (SID) correctly determined that I could not occupy the same surface coordinates as those *real* crates stacked right where I'd been (or would be) three-hundred-some-odd years hence. It faded itself, me and my Crate gently into being about a yard from the spot. There was no one around, according to SID, to see the apparition. Unless you happened to count the insensate gentleman two crates to my right.

I cautiously exited the TeGrEn and slid it up against its neighbors on silent Grav-Ex coasters. Then I went, as they say, for a little "rec'y."

The best-laid plans of Arthur Dunbar ne'er gang agley—or at least they so rarely do that it doesn't count. The crates my TeGrEn nestled against belonged to that magnificent, towering vision just across the pier, and that vision was the *Essex*.

She rocked gently, bowsprit thrust over the planking like a questing arm, masts sequoia-tall, tickling the unseen stars through their blanket of thick, archetypal fog. She murmured in her sleep, too, musically; she did not snore like the sodden gentleman behind me. I listened to her croon a while—absorbing the polyrhythms of wave-lap and rope-tap, the close violin harmonies of light breezes through ratlines—then returned to my time machine, feeling like a certain H.G. Wells hero as I slipped in, swung the door into place, and settled down to wait.

I slept. I wasn't supposed to sleep. That was one of the reasons for Shifting at midday Gridtime. But I had chosen the comfort of my bunk over the uprightness of my console chair, and I could hear *Essex*'s silken cooing through the external monitor, and it lulled me completely. I dreamed I was already aboard her, rocked like a baby in a warm, close cradle, the scent of tar and brine and pine pitch caressing my dozing senses.

I woke suddenly, aware of a braying sound, and was surprised to find that the rocking was no dream and that the braying was laughter. That faded, the rocking continued ceaselessly. I *was* aboard the *Essex*, I realized, and had obviously slept right through the loading of my Crate. Just as well, really. It made for less time with nothing to do but study history and make useless log entries.

I checked the external monitor. The hold was as dark as the inside of the idiomatic hat. I assumed that the hatch was closed and that the crew, from the sound of it, was in full swing up on deck. I palmed the door release, thinking I would take a quick look around by disclite. The damn thing clicked, hummed, and stayed perfectly shut. I tried again. Same result. I could see it now—banner headline: *Post-graduate Student Found Mummified in Time Machine*.

Muttering veiled obscenities, I pushed against the door with the flat of my hand. When that didn't work I panned the external monitor. Uniform blackness met my eyes. Next I ordered SID to perform a sweep of the immediate area. As I suspected, the TeGrEn and I were neatly hemmed in on all sides by immovable, solid objects. I should have foreseen that, of course, but hadn't. It meant another Shift (my Eye would be having fits) and disarranging the *Essex's* neatly packed cargo hold. Always supposing that there was even a place large enough for me to Shift to.

I put SID on it. He (you will pardon my anthropomorphizing, but when you travel alone in a crate no bigger than a small horse box, it comes naturally) came back with a barely big enough spot just below the forward hatch. I fed the data through the Plotter and in a moment's time had skipped back an hour, Shifted sideways about four yards, and come up in SID's targeted location.

The din of falling crates was like a convention of rock drummers, all soloing madly and cranked to eleven. Inside my safe-haven, I cringed comfortably and waited. The hold was crawling with sailors in the wink of an eye. I adjusted the external monitor and was rewarded with a striped view of a gaggle of ancient and not-so-ancient mariners swarming down the central aisle.

"Aye! Here't be!" announced one gnarled specimen. "Holy Mother, will ye look a' tha'! O'Hara, I thought you scum packed this tight."

"Did, Mr. Piggot, sir." The wiry O'Hara bounced as if he was on a spring. "Tom Farley and Matthew will attest to that."

"Aye? Well, it ain't tight now, Cargomaster. Get your boys on't now or we'll be late t'sail. The master'd not take kind t'tha."

"No, the master would not take at all kind to that."

The voice was big and it came from directly above me. As I scrambled to orient myself to that fact, two booted legs appeared in my striated "portal" and I realized the TeGrEn was tucked in under the forward ladder. The man descending the ladder was twice the size of his voice. He effectively blocked my view of the other men.

I sucked air and held it. *Black Charley*.

"Who's responsible for this mess?" he asked, his voice smooth and soft as the velvet coat that covered his broad shoulders.

Well dressed, I thought. Somehow I hadn't expected that, though I knew that Charles Dunbar, like a good many East India shipmasters, was a fairly wealthy man. A goodly amount of the stowage in this hold might very well belong to him, personally.

"Well?" the voice roared. I could almost see the sailors cringing into their cargo.

"It were secure, Cap'n," stated a wheeze-whine voice—Piggott's, I thought. "Absolute, sir."

"Well, it isn't secure now. See to it. And whoever's responsible . . . watch your step. Those're my personal goods."

He swung about then, and I got a glimpse of his face. It was long, square-jawed—chiseled, as they say—with high cheek bones and aquiline nose. Dark brows, beard, and hair, and pale frost-bit eyes sharpened the focus dramatically. He was my ancestor, no doubt about it.

We left the docks in about three hours time. I tried to concentrate on period history, noting what I could or could not know, say, or do. But *Essex* was making it hard to keep my mind on that pursuit. I could feel the water gliding beneath the keel, could hear the symphony of creaks and rustles and gurgles as she made her stately way down the Thames to the Channel.

It was safer in the Box. I knew that. Especially since I'd been forced to call attention to the hold. I was not supposed to be found until we cleared the mouth of the Channel. But I *had* to—absolutely *had*— to see what was happening topside. I slipped out quietly—as if I could really be heard by anybody but the ship's cat—and shined my disclite surreptitiously about. The forward hatch would not be an ideal place to peer from, so I made my way aft, seeking a ventilation shaft I recalled seeing in a decking plan.

Finding it was easy enough (I gave my memory a pat on the back), but reaching it was something else again. There was a pile of burlap bags between me and it, all packed to the seams with something. Peat, I realized as I began my climb.

I reached the top of the heap without too much difficulty and poked my head up into the shaft above it. The view was not terrific, but it beat the inside of the TeGrEn all to pieces. Iron bars criss-crossed a sweeping panorama of satiny decking, coils of rope, the butt of a nearby cannon, and the juncture between deck and mainmast. I could also just see the starboard rail and feet—lots of feet.

It was fairly quiet outbound and I'd hoped to be around for her approach to Bombay where I had read there would be a thirteen gun salute and an honor guard waiting to see her in. Here, there would be people lining the docks, watching—but they would be concerned merchants, wives, children, urchins longing to be on the outbound tide.

I sighed.

"So ye like the sights hereabouts, do ye?" The voice shocked me out of my daydream about half a second before a strong pair of hands grasped the tail of my coat, and the seat of my britches, and hauled me down off the peat pile.

I tumbled all the way to the bottom and came out upside down against a ploughshare, staring cross-eyed into the black silhouette of Mr. Piggott.

He let out a wheeze of laughter. "Ain't ye just a wee bit auld for these shenanigans, son?"

Captain Charles Dunbar eyed me with what I took as suspicion. I stood trembling in his cabin waiting for the worst case scenario to be played out: I am killed and thrown overboard or let off politely quay-side while my Temporal Grid sails blithely to Bombay without me. Of course, it would never make Bombay. After two months sans Time Traveler, its recall mechanism would do one last all-out search for my vitals and, not finding them, Shift back to its original coordinates in London-future where QuestLabs and Oslovsky U. would decide if I was worth rescuing. I would be either dead or stranded in 1805 regardless. Right now, it was all I could do to keep my head up and my eyes level with the captain's, praying the name "Black Charley" was a comment on his startling coloring and not his personality.

He strode right up to me—not quite towering above me, but seeming to—and put his nose nearly against mine. "Est-ce que vous êtes français, monsieur?"

"Oh, no, sir," I replied immediately. "I'm A-English."

"Ah! Mais vous comprenez la langue, non?"

"Vous comprenez français, aussi, monsieur. Etes *vous* français?"

I had him there. He could hardly accuse me—in French, no less—of being a French spy on the grounds that I spoke the language. He scratched the corner of his mouth. It was threatening to curl into a smile. I felt a tingle of hope.

"Are you sure you're not a French spy, boy?"

"No, sir. I don't think so, sir. I was born in York" (OK, so I was born in *New* York—close.)

"York?"

"Yes sir."

He glanced aside at his first mate, Reardon by name, who stood silently aside, watching.

"Not Paris?" ("Pah-ree," he said quite properly.).

"Not Paris." I stressed the "s" at the end of the word.

"Have you been to Paris?"

"No, sir, I have not."

"Yet you speak the language."

"Preparing for the worst, sir," I said before I could stop myself. I cringed. He stared. He sent his mate a wide-eyed look. Then he threw back his head and roared.

"Not a spy at all. A jokester."

I nodded, relaxing.

"Then what the bloody blazes are you doing aboard my ship, scurrying beneath-decks like a damned bilge rat?"

I had never heard anyone seriously use the term "bilge rat" before and it completely up-ended me. I laughed. "I'm sorry," I apologized to his scowl. "I've been called a lot of things, but never that. I'm a-a student, sir. And my family has an eye to a career in medicine. But I . . . " I paused and gazed around, my eyes going to the windows of the transom. "I've always loved the Sea."

Well, I couldn't have said better. The cap's frosty grey eyes lit up and went into pinwheels like a McCaffrey dragon's, though other than that, his expression remained unchanged.

"Know your way around a vessel, do you?" he asked.

"I think so, sir."

He nodded, then put his fist in front of my nose and beckoned me to follow him. He led me from his cabin and up on deck, the silent first mate bringing up the rear. In the open hatchway, he pointed forward. "What's that, then?"

I followed his finger. "The mainmast, sir. Any fool knows that."

He crossed his arms over his chest. "Name me the sails on her. Bottommost up."

I grinned. Among her suite of sixty-three sails, the *Essex* carried several not found on other ships. Black Charley evidently expected me not to know that. "Yes sir!" I said and recited, "Mainsail, lower topsail, upper topsail, topgallant, royal, skysail. . . ." I paused just long enough to see a slow smile tug at the corners of his mouth. "Cloudscraper, moonraker, stargazer," I finished in a rush and was gratified to see a glint of surprise in the master's eyes.

"You know the *Essex*, then?"

"I do indeed sir," I said with only half-feigned eagerness. "She's the finest ship afloat."

"You're small, soft, and too glib for your own good," Black Charley informed me. "Can you think of any reason I shouldn't throw you overboard or send you home on a channel barge?"

Actually, I couldn't.

The first mate cleared his throat. The sound, so close behind me, nearly induced heart failure. "The young man did say he'd studied medicine, Cap'n."

"So he did." Charley's grappling hook eyes caught me by the throat. "Do you know aught of medicine, boy?"

"Well, I-I've only had two years, but—"

"We've no doctor on this voyage. Old one died at sea and the new man's been held up it seems. Little matter of a wedding, I hear. Your two years bests any man aboard . . . Doctor. . . ." He wrinkled a black brow—just one, like Mr. Spock. "I don't believe we've been properly introduced. What's your name, young man?"

For a split second, I courted the idea of saying "Dr. McCoy," but no one would get the joke for another 161 years. In another second I was wondering what he'd do if I told him the truth—that I was just as much a Dunbar as he was. *No,* I thought, *he's superstitious—might take it as a bad omen and chuck me oversides.* I took a page from the book of another time traveler. "Foreman," said I. "Arthur Foreman."

I'd hesitated too long and his eye noted it with a head-to-toe sweep. "You've no need to prevaricate with me, boy. I'll not squawk to your family."

"No, sir. Of course not, sir," I murmured.

"Ah, well, keep your secret, then." He turned his attention to Mr. Reardon. "Set him up in the doctor's quarters if you would, Jimmy. We'll be under sail in another hour." He turned and strode off, then, leaving me in the first mate's able hands.

I was shown a cabin and told that if I had any belongings in the hold, I'd best get them up before the crew found them. I brought up only items that a nineteenth-century stowaway might be expected to carry—a pocket watch, a diary, some clothing, a few books. One had a flat-screen monitor in the back cover that went with the touch-sensitive ultra-thin keyboard worked into the front cover. Without coded voice activation (the magic words: open sesame), it would stolidly remain a book through all prodding and prying.

As I was ferrying my goods topside, I recalled the disclite, which I'd pocketed just before I was discovered. I certainly didn't want to be caught with that. I reached into my pants pocket and felt empty air. The light was gone.

Adrenaline pumping, I stowed my gear, then returned to the hold to make a careful search of the area around where I'd fallen into the arms of the inestimable Mr. Piggott. Nothing turned up. Exasperated, I tried to think where else I might have dropped the thing. Really, it was stupid of me to have taken it outside the Crate. Unless I found it, it was quite literally history.

A scraping sound sent me a foot straight up into the hold's dim, turgid air. I spun just in time to see a tall, narrow shadow melt into the general gloom to the port side of the ladder. If that was a rat, I was in trouble. If it *wasn't* a rat, I was in trouble. I made my way quickly to the main deck.

We were nearing the mouth of the Thames and the air changed noticably, taking on a fresh, tangy perfume that the city's pollution had muted to a stale, briny smack. The crew began to scramble now, like rats in the rigging, preparing to unfurl the sails. I gazed up at the neatly collected stargazer and wondered if it had ever seen duty. On deck, the captain ordered men to the capstan.

The activity was at its height and our tug cast off when the mate called down from the helm. "Lighter approaching, sir! Off the port beam."

Captain Dunbar turned, frowned at his first officer, then ordered his crew to stand down from the capstan. He took the view from the port rail, then waved down at the approaching boat before ordering a ladder thrown overside.

On his way to the poop deck, he glanced my way. "Well, Arthur Foreman, I think you'd better clear your quarters and think of a reason I oughtn't send you home on that lighter. We've got us a real doctor now."

A real doctor was not all we had. We had a real doctor's wife.

Mary MacCormac was as stunning as a starry night. Hair the color of a sailor's delight sunset (a yard of it, at least), creamy, white-cap skin, sea-green eyes. Here, I could hear every man aboard thinking, is a proper woman for a mariner. She had a sweet, graceful manner as well—shy, warm smile that could turn quickly saucy; fey glint in the eyes. She was mesmerizing.

Her husband, on the other hand, seemed hardly worthy of her. Ian MacCormac was a dark, curly-haired, faunlike man. A colorless man—unremittingly grey and black. Odd, I thought, how a man so like Black Charley in coloring could seem so drab in comparison—so insignificant. But then he would look colorless next to Mary, and because of Mary we did not like him.

I had already begun to think of myself as a member of *Essex*'s crew, but I was not that, and her master quickly reminded me of the fact.

"Well, Mr. Foreman," he said when the MacCormacs had been ushered below. "Have you thought well about what will induce me not to send you back to town in that lighter?"

I hadn't thought of it at all, actually. I had been thinking of Mary MacCormac. I could only comfort myself that he was probably toying with me. If he really wanted to throw me off the ship, we wouldn't be standing here discussing it. "I don't know, sir," I murmured.

"Well, have you any special talents? Do you sing or dance or play the pipes or fiddle?"

I am, as providence would have it, a most untalented individual. I could think of nothing except—"I am possessed of a certain . . . clairvoyance, sir."

Charley laughed. "A fortune-teller?"

I shrugged. "I see things."

"Do you now? And what do you see about me, eh? What's in the future of

Charley Dunbar?''

I looked thoughtful for a moment. ''A record-breaking voyage. The ownership of three of your own vessels. Retirement as a wealthy man to a large estate in. . . .'' I rubbed my temples. ''Hampshire.''

He blinked. ''I've always fancied Hampshire. But you no doubt could've guessed that or taken it from Reardon. Tell me something else or . . .'' His eyes wandered to the rail where the pilot of the lighter was hobnobbing with the bosun and cargomaster.

I could see the situation called for more imagination on my part. What could I tell him without breaking some unwritten Law of Time Travel?

''Well?''

''Today is the twentieth of June,'' I said. ''Tomorrow the East Indiaman *Warren Hastings* will be taken by a French vessel. A . . . a frigate . . . The *Piémontaise*.''

Charley goggled at me. ''The *Hastings* ships forty-four cannons and possesses one of the finest crews in the Fleet—you ask me to believe she can be taken by a single frigate?''

I nodded. ''And towed to port in record time.''

His eyes narrowed and he waggled a finger at me. ''Clever boy. You've told me a tale I'll not be able to verify 'til we make our first port o'call.''

I smiled affably.

''Very well, then, Arthur Foreman. I'll let you ship on the *Essex* . . . maybe . . . if you tell me one more thing—your real name.''

I ran down the list of possibilities and came up with only one I was willing to live with. ''Dunbar, sir.'' I told him. ''Arthur Dunbar.''

His pale eyes widened. ''And will you now claim to be my illegitimate get, or some such?''

''No, sir. I know both my parents quite well. My father is Curtis Dunbar—a doctor out of York.'' (Queens, actually. And he was a particle physicist. Close enough, though. He'd doctored a lot of quantum theories in his day.)

''I've people in York. You figure we're related?''

''I really couldn't say, sir.'' I really couldn't. That *would* be breaking the Law.

He eyed me up one side and down the other, then made an explosive sound between his lips. ''Ah, you've tweaked my curious bone, boy. But if you're to have passage on this vessel, you either pay or earn your way. I suppose you've no coin?''

''I do sir, but I don't want to be a passenger. I want to *serve* the *Essex*.''

''How well do you think you can handle the lines?'' He nodded at *Essex's* towering masts.

''I've sailed small boats, sir. Nothing bigger than a large fishing yawl.''

''I'll teach you then. Piggott'll teach you. For now, you start at the bottom. Consider yourself my cabin boy. Get your things into that wee cabin next to mine.''

I nodded vigorously and thanked him, but he was already off, calling the hands to stations, yelling at the lighter to cast off. As I went below, the fore capstan had begun to turn and *Essex's* fore course to blossom.

Our first two weeks at sea were remarkably uneventful. There was no sign of the French and the captain teased me daily about my prophetic utterance, at the same time prodding me for further predictions. I demurred, saying with affected grief that I couldn't make prognostications in the face of such skepticism.

I spent a lot of my free time (when Charley didn't have me dancing the hornpipe) searching the forward hold for my disclite. No luck. I began to pray that it had been eaten by a large and desperate rat, but knew there was little hope of that.

I also managed to spend some time with the incredible Mary MacCormac. Everybody managed to spend time with her, from the youngest swabbie to the hoariest tar. There was an absolute rash of minor ailments and injuries about the *Essex;* ailments and injuries the doctor would patiently check before sending the suffering to his inestimable wife for liniment or bandage or sympathy. And while good Mary worked on the poor, wounded souls, they would gaze up into her great ocean eyes and smile and dream of mermaids.

I was not nearly so clumsy. I simply frequented the MacCormac's province as a matter of friendliness and courtesy. And so did Captain Charley. He dined with them every evening, placing them before any of the rather wealthy passengers at his table. I was also included in the select "head-of-the-table" grouping, I suspected, so that Ian MacCormac would have someone to talk to while Charley monopolized his wife.

She was bright as well as beautiful and charming, and I wondered how the young doctor had been so lucky as to catch the eye of such a girl. So, apparently, did Charley, for he made a point one evening of asking her how they met.

Mary dimpled splendidly, then flashed her quiet husband a brilliant smile. "Well, I must own, it was all due to my clumsiness."

Ian MacCormac colored. "Nonsense, darling," he murmured. "You are not capable of clumsiness. It was that idiot horse of yours." His eyes worshipped her and I liked him a little more for that.

Mary laughed and continued with her story. "I was riding in the park when my gelding took exception to a feathered hat. I agree with him that it was in the most dreadful taste, but I'd not have bolted at the sight of it. Strawberry, however, found it quite alarming and took off at a dead run. He shied again at a gaggle of white geese—I can only assume because they were also wearing feathers—and off I came. Ian—"and she covered his hand with hers—"was out for a stroll and witnessed my unseating. He very kindly bundled me up, took me home, and looked after my poor concussed head. He looked in on me every day for a week and by the time I was right again. . . ." She blinded us with another smile which, ultimately, ended up caressing the enviable Ian. He smiled in return and I grudgingly admitted he was not completely without charm, grace, or beauty.

Obviously, I thought, *this is the sort of patient-doctor attraction one finds in psychology texts.*

"You're a lucky man," I told MacCormac as we strolled the deck after dinner. We had caught the Tradewinds and were now heading into the Horse Latitudes; the weather was mild and pleasant.

He followed my gaze to where, up on the poop deck, Captain Charley allowed Mary to handle the wheel. "I'm well aware," he said. "Well aware. Although, I must admit, I sometimes wish my dear wife was a bit more homely. I'd love her regardless and other men might not be so attentive." He laughed and shook his head. "Oh, I'm wrong about that, I know. She could have the face of a cow and still be Beauty incarnate. You know what I mean," he added, seemingly embarrassed.

"I do," I assured him.

He laughed again. "I sometimes have this irrational fear that one of her many admirers will try to eliminate me."

"Nobody would be as stupid as that," I said. "That would hurt *her*. She obviously adores you."

"Yes, she does. Incredible, that. And you're quite right. No one would hurt Mary. I haven't to worry."

I had to worry. There was no sign of my disclite and I was haunted by the suspicion that someone was watching me as I searched for it. I considered telling the captain I'd lost an odd family heirloom and hope someone would come forward with it. But I didn't have to. Someone came forward anyway.

I was returning from one of my clandestine visits to the hold when a tall, very solid shadow blocked the companionway just outside my cabin door. It was Reardon.

"A word with you," was all he said, then followed me into my cabin.

It seemed exceptionally crowded in the cubby suddenly. I offered him a seat on my bunk. He declined, so I sat there waiting for him to speak.

"May I ask," he said finally, "why you have told the captain your name is Dunbar?"

"Because it is."

"You said Foreman."

"I lied . . . a little. Foreman is my mother's family name. (Also a lie.) You see, I knew the captain's name was Dunbar and I didn't want him to think . . .well, you understand."

His brow puckered. "I suppose. Now may I ask what you find of such interest in our forward hold?"

I saw no reason to dodge. "I lost something. A very rare family heirloom."

"Oh? What, then, a pocket watch? A ring?

"A . . . belt clip. It's a disc about so big—" I made a circle with thumb and forefinger. "It . . . well it's luminescent."

"Ah," he said, nodding. "You mean, like this." He held out his hand. The disclite sat in its palm.

"Yes! That's it!" I reached for it. His fingers denied me access.

"Can you explain by what principle it works, Mr. Dunbar?"

I scratched my head. How many people could explain the principle behind any contemporary piece of technology, even one they used every day? Windmills were probably a mystery to all but the miller. "Not really," I said. "I believe my uncle said it had something to do with, um, phosphorous and the absorption of sunlight."

"Your uncle?"

"An inventor," I lied glibly and

smiled. "He makes less money than Aunt would like, but enough to finance his projects." I gestured at the disc. "This one was supposed to help miners see what they were digging up."

"I should say it works quite well—better than I would expect from a light-absorbing phosphorous. I find it rather astounding that your uncle makes such a modest living. Common wisdom has it that everything of value has already been invented—that all we may hope for is further refinement of what we already possess. Something like this . . ." he flipped the little medallion in his hand, "would revolutionize the mining industry . . . and stun the patent office."

He was not buying this. Next he would tell me he was raised on the moors and knew all about phospor-producing plants.

"I was raised on the moors, Mr. Dunbar. And I've never seen such a light as this." He thumbed the thing on and hit me in the face with a splash of yellow light.

I blinked. "My uncle has quite a few new tricks up his sleeve, I guess."

"Someone does," he said and pocketed the disc.

My eyes followed it. "That means a great deal to me," I said. He could have no idea how much. If QuestLabs found out I had lost a techno-gadget like that in Regency England. . . . "Please, sir, may I have it back?"

The Oliver Twist gambit failed miserably. "Don't whimper, sir," he ordered me. "You are a sailor . . . at least for the time being."

"But what will you do with it?" My eyes never left his pocket.

"I don't know. Perhaps the captain will find it of interest," he said, and left me.

I was a passable cabin boy, according to Captain Charley. I was quick and thorough and showed good humor. Meaning I put up with his moods, his autocratic style, and his hazing. We came to an understanding when I began to return his pranks with stunts of my own. Replacing his moustache wax with boot-blacking was my grand finale. I was not prompted to give an encore.

Charley also liked the way I handled the passengers. There were seven on this trip—two couples and, between them, three children. I entertained them, which meant Charley didn't have to. Instead, he could spend supper gazing soulfully at the doctor's wife.

"She's a powerful woman, isn't she, Arthur?" he asked after supper one evening. We were seated in the bows on a couple of empty crates; he, smoking a pipe, I, attempting to whittle something. The night was exceptionally balmy and *Essex* ghosted under flying jib and reefed fore-topsail.

I knew who he meant, of course, but pretended not to. "Who?"

"M-Mrs. MacCormac." His tongue stumbled over the title, straining toward her first name.

"Mary?" I grinned, realizing that I, a lowly cabin boy, had been allowed a privilege of which he but dreamed. "Yes, she is exceptional."

He leaned toward me, elbows on knees, his pipestream pointed at my nose. "*Powerful*, boy. She *pulls* a man. Pulls him like the Sea." He raised his head and gazed oversides at phosphor kittens playing pounce with dark troughs. He seemed bemused. "I've never known a woman like her, Arthur. So quiet and deep one moment, playful the next."

He might have been describing the Sea, and I said as much.

He nodded, looking sage, and drew on his pipe. "A man might be able to trade the Sea herself for a woman like that. She's Ocean's daughter—has her mother's eyes. I sometimes feel as if she was sent." There was a long moment of silence while he ruminated over his smoke. "She's wasted on a man like MacCormac."

Something in his tone made my teeth itch and my arm hairs stand at attention. I laughed wanly and whittled too big a chunk out of my wooden whale's fluke. It would make a fine dolphin. "Oh," I said, "he's not such a bad sort once you get to know him. He's seaworthy, I'd say. Says he can't take being landlocked. He loves her madly, of course. And she, him."

My last observation sent the captain's pipe overboard. He swore and stalked off to his cabin, face black as a rain-filled thunderhead.

For some reason, after that, I began to watch Black Charley very carefully. My mother always said I was fey and right now my teeth and arm hairs were whispering of dark deeds yet undone. And Charley, increasingly companionable, pushed the whisper to a five-bell alarm.

"Arthur," he said one morning as I cleared our breakfast dishes, "tell me the future."

"Sir?" I clutched the plates tighter as the deck tilted sharply.

"I'm in the mood for some soothsaying. Tell me what the future holds."

"The abolition of slavery," I said, hoping it might shock him into forgetting what I knew he really wanted to hear.

He was thoughtful, but unsurprised. "Aye. Ungodly system, that. I've no doubt men of intelligence will soon put an end to it on English soil. But, say on. I want to know—"

"A Queen," I said quickly, as if inspired.

"A what?"

"A Queen will end slavery in Britain. A Queen named Victoria."

His eyes grew wide. "Indeed? Imagine that."

"Women will vote in elections soon, too," I continued. "And the first country to grant the right will be. . . ." I closed my eyes as if concentrating. "New Zealand in . . . 1893."

I opened my eyes to find him staring at me. "Well," he said, after a moment, "if all women were like our dear Mary, then they should have the vote already."

Damn, I thought.

"I'd in mind something a wee bit closer to home." He smiled.

I made a sorrowful face and looked away from him out the mullioned panes of his cabin windows.

"What?" He rocked forward in his chair. "What is it, boy? What have you seen?"

"The Prime Minister . . . the Prime Minister will die next year . . . in November."

He blinked. "Pitt? Ah, well, he's old. He'll be sore missed, of course

. . . by some."

I glared at him. "You don't believe me! You don't believe a word I've said. You're making sport of me."

He came to his feet as the ship, in the teeth of a fresh squall, pitched into a trough. He seemed not to notice it. I was nearly dashed off my feet—would have been, if he hadn't grabbed my arms to steady me.

"Arthur, lad! I'm not sporting, believe me. I can't say as I *believe* all you've told me, but then I can't say I don't. I find it fascinating's all. And I credit it *could* happen as you say. But it's not Pitt or slavery or some unheard of queen I care about, you see. I want to hear about *me*. *My* life. Tell me, boy. Do you see me wed . . . to *her?*"

"No, sir," I said, then bit the pill and told him what I did know. "You *will* marry, but your wife's name will be Maureen. Maureen Llewellyn."

He let go of me then, and the little fever-light in his eyes died. "Ah, it's all superstition, anyway," he said, and went up on deck.

The storm worsened. By midday the decks were awash and the passengers had completely disappeared. I could imagine them, cruelly, moaning in their berths, ready to repent of everything and meet the Reaper. I, of course, have never been seasick in my life, but this storm challenged even my constitution. The waves were twenty-footers and the rain drove horizontally across the slippery decking.

I was helping batten down a loose cannon when I heard a shriek that was not the wind. I turned from my lashing job, peering through the chaotic, colorless whirl toward the poop deck. Beneath the wildly swinging spanker boom, my eyes locked on a tumble of activity. It took me a moment to realize that someone had fallen from the mizzen mast.

The cannon forgotten, I launched myself aft. The deck writhed under my feet like an angry whale. I'd just reached the steps below the poop deck when Captain Charley came sliding down them and virtually into my face.

He grabbed me, shouting, "The doctor! Get the doctor! We've a man down!"

I did as ordered, nearly falling into the aft companionway.

I brought back, not only the doctor, but the doctor's wife as well. Mary MacCormac was determined to aid her husband and she was not, I discovered, a woman to be argued with.

"You can't come," I had told her as she struggled into her oilskin sou'wester.

"Ah, but I *will* come," she said, not even pausing to look at me.

"It's dangerous! Tell her, Doctor. Tell her how dangerous—"

He afforded me a grim smile and dashed out, bag in hand. Mary continued to ignore me, fastening her hat securely over her braids and making a beeline for the door. I stepped in front of her. She put both hands on my chest and pushed. She was stronger than she looked.

I followed her up on deck, reaching the poop just in time to see Dr. Mac (as the crew was pleased to call him) kneeling over the fallen sailor. It was Tommy Rodgers, a boy of about seventeen. White-faced and trembling, he clutched his right arm. It was obviously broken—a jag of bone could be seen amid cloth and blood.

I wanted to be sick, but a weak-kneed salt was an oxymoron and I wouldn't let Charley see me puke. The only one here with an excuse for that sort of behavior was poor Tom.

The doctor was at work over the wound, and his missus was at work as well, keeping the boy's mind off his pain and fear and his eyes on her angelic face. They made a great team, did the MacCormacs. Dr. Mac set the forearm before Tommy realized it. The boy let out another great shriek and swooned.

He'll dream of Mary, I thought, and stood by, ready to help lift him below.

Charley, clutching a thick rope for support, looked on from the mizzen stepping. "Is that it then, Dr. Mac?" he shouted. "Is the arm set?"

"Aye!" MacCormac shouted back, and nodded vigorously for emphasis. He straightened, clutching his bag. "We've got to get him below!"

"The boys'll take care of that. Never you mind. Piggott! Carew! See to him!"

Those two able-bodies jumped to it and MacCormac and I backed away—I toward the wheel, he toward the port rail. At that point, everything seemed to happen at once. I glanced at the helmsman and saw a sudden terror leap in his eyes; I heard Charley roar a warning and Mary MacCormac scream. I spun back toward the bows. A blur of movement to my left drew me instinctively right, toward where the doctor stood like a post, waiting for a huge, free-swinging block to dash his brains out. I dove at his feet.

The block and its thick twist of hemp whizzed overhead as we sprawled toward the rail. Mary came right after us, crying incoherently into the gale. She was knocked from her feet by *Essex's* sudden starboard lurch and schooned along the deck on a wash of sea water, her legs tangled in her long skirts. She was headed straight for the rail.

MacCormac shrieked and struggled sharply in my grasp. There was nothing we could do, but Charley, in some super-human effort, slid after her and, as she flung over the edge, caught her water-logged skirts and hauled her back into his arms.

They stared at each other for a long, pregnant moment, Charley gaping like a sea bass. Then, the young lady threw her arms around his neck and squeezed him so hard I swear she wrung water out of him. Before he could do more than open and close his mouth once, Mary MacCormac had disentangled herself and scrambled to where her husband lay, soaked and stunned.

The hug she gave him was even more prodigious than the one she'd given Charley. That done, she reached down, rent her skirt from hem to waist to disentangle her legs, then hauled her husband to his feet and supported him down the steps to the main deck. Dazed, I rose and followed, my gaze straying aloft, wondering where in hell that block had come from.

"I do believe it was on the mizzen mast," said Mary sometime later when we were once again dry and sane, and steeping in the normalcy of hot tea.

We were in the captain's salon (captain's mess suited it better at this juncture)—Black Charley, Dr. Mac, Mary and I—seated around the sturdy table, clutching our mugs as if they might fly away. There was no real danger of that. The Sea had calmed significantly and *Essex* rolled rather than pitched.

"The spanker gaff was whipping about and so was the boom. It's no wonder that block came free." Her sweet voice sounded so calm, so certain.

We men merely nodded.

"Well," said MacCormac at last, "I daresay 'thank yous' are in order all around. To you, Arthur, for saving my life and to you, Captain, for doing the same. If my dear Mary had gone overboard, I might just as well have followed her."

"You just about *preceded* her," I said and shivered at the memory of those two very close calls.

"Then I'd have followed him," said Mary firmly and covered her husband's hand with her own.

I glanced at Charley. His eyes, narrow and overbright in his pale face, were locked on their entwined fingers.

"That," I said, "would have been a horrible tragedy." I got Charley to meet my eyes and wasn't sure I liked what I saw there.

"Well, no harm done," said Mary. "Tommy will be fine, the block hit no one, I did not—thanks to our brave Captain Charley—go overboard. We are all as we should be—safe and sound."

Charley shook his head. "I'm not brave my dear. I was scared as a schoolboy up there. If anything had happened to you—"

Now Mary's hand moved to the captain's as he worried the handle of his mug. "Nothing did and nothing will. You see, I have a guardian angel." Her eyes sparkled like playful tropical seas. "Always have had. And my angel always makes certain there is someone or something about to preserve me when I get in dire straits. That's how Ian and I met, if you'll recall. He's one of my angels, too."

"Madam," said Charley most soberly, "I pray you will always consider me your angel." He raised her hand to his lips and kissed it.

I glanced at Ian. His grey eyes were blandly neutral. If any of this disturbed him, it didn't show.

Captain Charley was unspeakably cheerful the next day. I labored under the misapprehension that it was because we were to make port that evening in the Canaries until he swatted me on the back and said, "You're a blackguard, Arthur—you with your fortune-telling. I think I half believed you 'til last night."

"Believed me?"

"That malarkey about me wedding some bit o' muslin named Maureen. It's clear as can be, boy. It's Mary I'll wed or none at all."

It was not a bitter pronouncement of unrequited love; the man acted as if he was all but ready to go out and publish the bans.

"Charley," I said, forgetting my station of servitude. "She's married already. Seemingly quite happily so."

"Ah, but do you not see what's happened? He was her guardian angel, now *I* am. And what's a guardian angel, if not a hero? He's a mamby-pamby little boy, needing young Arthur to save his unworthy skin, but *I*—I saved *her*.

What woman will not fall in love with the man who saves her life? It's only a matter of time."

I shook my head. "Maureen," I repeated. "I'm positive your wife's name will be Maureen."

He pointed a finger at my nose. "*You're* a cabin boy. No, worse yet, a stowaway and a liar and probably a thief as well. Who in his right mind would listen to the likes of you?"

No one, I thought. And especially not a man so enamored of a Scottish sweet that his accent was beginning to sprout heather.

Santa Cruz de Tenerife. I had never seen it before. It sparkled under its veil of storm detritus like a platter of jewels. *Essex* stood in under a full press of sail in a stiff breeze, and I wished I could be in two places at once so I could stand on shore and see the great, white cloud come on.

I gave a moment's thought to using the Grid to do just that, but knew, if I did, that my Shift-Eye would have my tail feathers for the unauthorized expense. So I stood in the bows and watched the billowing mass of canvas above me. I must've looked like the biggest tourist this side of Casablanca. I could hear the crew chuckling at me. I was getting ready to slink off to a less obvious vantage point when Mr. Piggott sidled over.

"Aye, take a good long look, lad. She's the Queen of Ships, she is. Every time *Essex* puts on her show, I fall for her all o'er agin." He winked at me. "I reckon that's her way of keepin' her crew. Sure ain't her master's sweet temper."

Essex's show was over soon enough, her sails furling as we entered the port—but it had served to draw a crowd to the quay to see her in. She stood off at anchor, the small cargo for this port o'call going off in a lighter; a return cargo arriving the same way. The passengers went ashore—the crew would have their turn later—and I watched with interest as Black Charley conducted his private business with a local merchant. Before they had shaken hands, the merchant had made it worth Charley's while to land some Indian goods here on the return trip.

Our captain was smiling contentedly, no doubt counting his earnings, when Mr. Reardon put in an anxious appearance.

"I've just heard the most confounded news, sir," he told the Captain. "The French have taken the *Warren Hastings.*"

Charley was miserable. And he was avoiding me. In two seconds I had gone from amusing companion to unwelcome Sibyl. I rededicated myself to my project (the reason I was here, after all) and used the *Warren Hastings* affair as a study in historical veracity.

History, in case you hadn't noticed, is rather like the old schoolroom game of Telephone. An event takes place and all witnesses concoct their version of it with or without comparing notes. They then disperse to disseminate the information to one or more others, who go on to retell the tale of their own select group of listeners. Only eventually, unless one of the original witnesses thought, "Gosh, I'd better grab a piece of slate and scratch this down for posterity," the tale is set to bark, slab, or paper and passed down further via copious copyings from one written source to another. There may even be a plethora of originals.

Take the fall of the Roman Empire for example. Most twentieth and twenty-first century histories making reference to that series of events tend to lift material from Gibbon, who, unless he possessed a time machine of his own, was not among the eyewitnesses. Until QuestLabs began dabbling with the Temporal Spectrum, Gibbon was our eye on the Roman Empire, yet a mere link in the great Telephone Tree of Time. No offense to that illustrious gentleman, but, as in a game of Telephone, things inevitably get lost (or at least amended) in the transmission.

The textbook version of the *Warren Hastings* capture was pretty detailed and made a great sea story. A forty-four gun British East Indiaman with full complement goes up against a French frigate. The frigate is seriously outgunned. Somehow the frigate in question, *Piémontaise*, according to history, blows the rigging off the bigger ship, then tows her to port at seven and a half knots under three single-reefed topsails, foresail, and mizzen staysail. One helluva frigate.

What history fails to mention is that the *Piémontaise* was not alone. She was accompanied by a ship-of-the-line—a battle wagon named *Bonaparte*—who handled most of the actual fighting. The *Piémontaise* then struggled to port about three knots, flying everything but the master's sheets and damn near springing her main mast in the process. Well, at least according to our Canary Island contacts.

On the social scene, since I was denied Charley's company, I took up with the MacCormacs. Exposed to him more often, I found I liked Dr. Mac. We had a lot in common. Not *interests* exactly—I mean, after all, we did have what amounted to a monumental generation gap between us—but we shared attitudes about things. And I have to admit seeing him with Mary, I had to forgive him for being married to her. (As if it could make any possible difference to me.)

"Doesn't it bother you," I asked him one day as we plied the waters off Africa, "the way men react to your wife? I mean, she's such a striking woman, a fellow is hard put not to court her almost without meaning to."

"Aye, well," he said, smiling ruefully, "it's just like that, you see. There's not much either of us can do about it but adjust. It's not as if it's anything she *does*. It's just who she *is*. She's as true as can be. I've no lack of faith that she loves me as much as I love her. But the *men*, now. . . ." He chuckled and made a nervous gesture. "Sometimes I look in Captain Dunbar's eyes and I swear I . . . I can almost hear him condemning me for daring to be married to her. Makes me feel downright unworthy and well . . ." He ran his finger around the inside of his shirt collar, ". . . a little uncomfortable. That's a powerful man, that," he added.

It was true, I realized as I watched Black Charley watch Mary MacCormac, that if she were my wife, I'd find the look in Charley's eye more than a little discomfiting. Oh, not when he looked at *her*, of course. If ever a woman was worthy of that worshipful gaze, it was Mary Mac. But when the captain's eyes fell on her poor husband, even *I* took a chill. There was jealousy in that look, and soul-rending sorrow, and what I hoped to God was not murder.

Charley Dunbar was a man who, though master of his own ship and, he'd have said, his own fate, was to be denied something he had begun to want very much indeed. And I, Sibyl, bearer of that bad news, was now the object of his taciturn ire.

I tried reasoning with him. Usually during his stints at the wheel when he couldn't escape me. "Charley," I'd say, and he'd glare at me out of the tail of his eye. "Captain Dunbar, then—if Mary MacCormac's your standard of female excellence then surely this woman you're to wed will be just as excellent. Maybe even more so. Just think of it. To win you she'd have to outshine the doctor's wife, wouldn't she?"

If he ever considered that argument at all, I never saw a sign of it. He'd just stand there—silent, craggy, inflexible—while I sweated and stared at his profile.

Then something happened that changed all that. I had no idea what it was. I only knew that just as we were approaching the Cape of Good Hope, Charley called me to his cabin for breakfast and behaved as if nothing had ever come between us.

"Tell me, Arthur, lad," he said over coffee. "Have you any more prognostications for me?"

I looked at him squarely, then. That was when I saw the gleam of—God knows what—in his eye. "W-what sort of prognostications, sir?"

"So, I marry a woman named Maureen, not Mary, eh? Maureen Llewellyn. You're certain of that, are you?"

"Yes, sir. Absolutely, sir."

He nodded and sighed greatly. "I can no longer claim not to believe you, boy. You foretold the *Hastings* matter with complete clarity. You have the Sight, no doubt about it. I must trust what you say. In what year will I marry?"

"Well, sir, that's debatable. I mean, uh, I can't really see that very clearly." Actually, not only was the *year* of his marriage a matter of dispute, but there was even some doubt that he actually *married* at all. There has always been some question about the legitimacy of the branch of the family tree for which Charley is responsible. However, that wasn't something I could tell Charley.

"What do you see?" he prodded.

I picked at a crumb on my plate, then looked up with this Saint-having-a-revelation look on my face. "Britain will win the war!" I exclaimed.

He waved that aside. "A foregone conclusion—"

"In 1814, the war will end . . . or at least, it will *seem* to end. But not before Napolean takes Vienna and Berlin."

He stared at me. "The devil—! Are you serious?"

I had distracted him. Relieved, I nodded vigorously. "This year, Napolean will take Vienna; next year he will take Berlin. But Lord Admiral Nelson will rout the French in a sea battle at Trafalgar. The forces of a British led Coalition will take Paris in the last days of March 1814 and Napolean. . . ." I wrinkled my brow. "He'll be exiled to-to an island. But, beware!" I warned dramatically. "Napolean is clever. Out of sight is not out of power."

Charley was nodding thoughtfully. "Wise words, boy. Now, about *my* future. . . ."

I nearly groaned. The stubborn so-and-so. "Three children. A grand home in the country. Horses. You've always fancied fine driving stock."

He sat back in his chair, beaming. "Aye," he said. "I have, at that."

We put into Cape Town to off-load some metals, farm implements, and foodstuffs, and take on ivory. One of our families left us there and the crew was permitted a brief shore leave. The MacCormacs invited me to go with them to see what sights there were and to visit what Dr. Mac called "native physicians." A less broad-minded soul would have called them "witch doctors."

We traveled by carriage to a place of mud huts and naked children, and there met a colorful gentleman our interpreter introduced as "King Isaac." From him, Dr. Mac got a sampling of native cures, while Mary carefully transcribed the directions for their use into a notebook.

We spent the better part of the morning in that pursuit before returning to Cape Town in the afternoon. We were crossing the road to the wharfs when the wild clatter of horse hooves and wagon frame caught my ear. I saw the thing out of the corner of my eye—a huge freight wagon, bearing down on us from uphill to our right.

Mary was already on the raised planking of the dock, waiting for us and watching the ships riding at anchor in the harbor; Dr. Mac was behind me in the road. Mary was in no danger, but Doctor and I faced imminent doom. In the split second I glanced at the rig, the driver gave the reins a last savage jerk and dove oversides. The team veered toward the center of the road, putting Ian MacCormac obliviously in their path. I spun back, grabbed his lapels and tugged. We both sprawled in the African dust, the freight rumbling harmlessly by at our feet.

Belatedly, Mary screamed. Her first concern when she joined us in the middle of the road, was for her husband's safety. His was for the safety of his native cures. Mine was for the vanished driver of the murderous rig.

I wasn't certain if the man was an unwilling participant in an accident or a willing participant in something far more sinister. From where I stood, his last tug at the reins looked like a deliberate effort to aim the rig right at Ian. And from where I stood, I could see only one person who truly wanted Ian MacCormac dead.

"And you were unable to locate the driver?" First Mate Reardon's brows all but disappeared in the furrows of his expansive forehead.

I shook my head, glancing at Captain Charley's impassive face. "I found the rig, but it was loaded with empty crates. No two were from the same vessel."

"So, you've no idea who might have arranged this accident," said Charley, frowning very slightly. "If, indeed, it was arranged."

"Is it common for people to be run down in the streets of Cape Town by anonymous freight wagons whose drivers disappear after the fact?" I gasped for air.

Charley shrugged. "These things occur, although I suppose I could investigate."

Right. Putting the rat in charge of the cheese.

"We're leaving port tonight," said Reardon. "The would-be murderer—"

"Is probably aboard this ship," I finished testily. "The only reason I can think anyone would want to kill Ian is to get Mary. And the only people who know Mary are aboard *Essex*."

I ignored Reardon's dark expression and glared at Charley. The way he was acting, you'd hardly think he cared that he'd nearly caused another human being to be flattened by that wagon. That a relative of mine—my own very, very great-grandfather, in fact—

The Very, Very Great grasped my arm urgently. "My dear boy, surely you're not thinking that someone aboard this vessel would cause Dr. Mac harm. Why it'd be suicidal to be at sea without a doctor. I'm sure it was something to do with those visits he made today." He screwed up his eyes expressively and put his finger alongside his nose. "The Hoodoo, you know."

"A c-curse?" I stammered. "You're suggesting Ian MacCormac is suffering from black magic?"

"There was that other time," said Reardon quietly. "That was well before he'd met any witch-doctors."

"What?" asked Charley. "You can't mean that block falling from the gaff! Why, that was a simple accident! A fluke of the storm. Dr. Mac was no man's target that day." He turned then, as if to dismiss the whole affair and strolled away 'cross deck, humming.

I glanced back at Reardon and saw that he was turning something over and over in his fingers. A closer look revealed it to be my disclite. I blanched, looking consumingly guilty or petrified or both.

"Do you wish to tell me anything, Mr. Dunbar?" he asked me solemnly.

My imagination saw the gleam of Calvinist fervor in his eyes. "If you expect me to confess to witchcraft, sir, I will not do it. As God is my witness, I am no witch."

Reardon quirked a brow. "I never supposed you were."

"You didn't?"

"Sir, we are civilized men. I believe we can abandon this talk of witches. This," he held up the disc "has nothing to do with witchcraft. Science, perhaps. Am I right?"

"Yes, but I told you as much."

"Ah, yes." He nodded. "Your uncle the inventor." He smiled and pocketed the light while I drooled hungrily after it. "When you are ready, Arthur," he said, and left me.

I watched Charley carefully after that—watched him from as close to Ian MacCormac as I could get, firmly convinced that he was the target of Black Charley's jealousy. All my fault, too. I'd been such a convincing Oracle that Charley now apparently saw no option but to take Fate into his own hands and throttle it. If Fate would not give him Mary MacCormac, he'd simply take her.

In the week that followed the Cape Town incident, I saved Ian MacCormac from a falling crate (left mysteriously balanced on the roof of a deckhouse), a flying capstan pole, and a loose cannon. By the end of the week, Ian was thoroughly spooked and I was ready to throw him and Mary into the TeGrEn and whisk them back to London.

"It's quite obvious," I told Charley one morning, "that someone wants Ian dead."

He glanced at me obliquely, spearing a sausage with his knife. "Ian, now, is it? Are you developing a fondness for our ill-fated doctor? That might not be wise."

"I'd like to keep him alive. And so would you if you really cared for Mary. She loves him, you know. If he dies, she'll be devastated."

"For a time. But with the loving attentions of close and caring friends, I'm sure she will survive—even prosper." He grinned at me wickedly, then said, "Dr. Mac seems to have drawn a guardian angel of his own. That's unfortunate. I'd hate to see one of the Almighty's agents sent back to Him prematurely."

I blanched. "I'm no angel," I said. "I'm not anything you'd understand, but neither am I a helpless medical student."

"Ah! You lied about that, did you? Reardon thought as much. And you're now claiming powers beyond clairvoyance, is that it? You hurl lightning bolts or some such?"

"Let's just say I have resources you can't even begin to imagine." I rose and left the cabin then, hoping I'd at least given him something to think about.

* * *

The storm struck without warning when we were two days out of Mauritius. It wasn't much of a storm—a lot of noise and bright lightning for the most part—but to Ian it was the Apocalypse. A sense of horrible foreboding seemed to have taken him, though all the while his wife tried nobly to cheer him up. When that failed, she donned trousers, shirt, and coat, and proposed to take his place among the seasick passengers. He protested the clothing almost as much as he did the precaution, but she and I outvoted him and convinced him to stay in their cabin with me as guardian whatever.

He made a last weak protest as she left, his black bag in hand, looking very dashing in his pants and coat. "Dear girl, whatever will Lord and Lady Branden think of that getup?"

"Why should I care? My petticoats and dresses are dangerous in heavy weather as I know only too well. I'll not be such a fool for fashion as to die for it." And she left, green eyes fierce.

Ian was silent for a long while, staring miserably at the gyrations of the lantern that hung above their cabin table. "Ah, Arthur," he said at last, "I've become such a hopeless coward, letting that dear girl take my duties over like that. But I swear I've this certainty that I'll not survive the night. Someone or Something wants me dead, and I've no clue as to how I can fight it. The worst of it is—dammit—the *worst* of it is that I've dragged poor Maureen along to witness my doom."

"Ian, nothing is—" I stopped and gaped at him, heart turning to stone. I'd misheard him. I must have. "Maureen?" I croaked.

He made a dismissive gesture. "Her given name. Mary is a pet name her father gave her that has stuck like glue. I prefer Maureen, myself. She's so much more a Maureen, don't you think?"

I licked my suddenly Saharan lips. "Ian, may I ask a frightfully inane question?"

He shrugged, not caring, I'm sure, if I stood on my head and whistled the "Marseillaise."

"Was your wife's maiden name Llewellyn, by any chance?"

He nodded.

"And her father was Llewellyn, Lord Eachan?"

He nodded again, then waited patiently for me to come back from the Twilight Zone. *Maureen Llewellyn.* Here. Now. On this ship. Charley Dunbar wasn't trying to *fight* destiny, he was just trying to speed it up a little.

"Dammit, Charley," I muttered, "why do you have to be in such a hurry?"

"Pardon?" said Ian.

"Nothing," I assured him. "Say some prayers for both of us. I've got to think."

What do I do now? If Charley and Mary-Maureen were fated, should I just stand aside and let events take Charley's natural course? Was Ian MacCormac supposed to die or had my presence created a situation in which he *had* to die? Had I saved him already from a fate he was supposed to have earned or . . . what?

I glanced at Ian. He really *was* praying, his eyes no doubt seeing invisible hosts, his lips painting silent litanies for their merciful pleasure. Dammit, I *liked* the man. He was honest, open-minded, intelligent, good company, and he loved Mary. I couldn't just stand by and let someone—even a damned ancestor—take her away from him over his dead body. There had to be a way to get my two progenitors together without taking Ian apart.

"Ian," I said, rising from the bunk I'd been sitting on, "stay here and don't open the door for anyone but me or Mary."

"Where are you going?" he asked.

"To do a little research." I started for the cabin door.

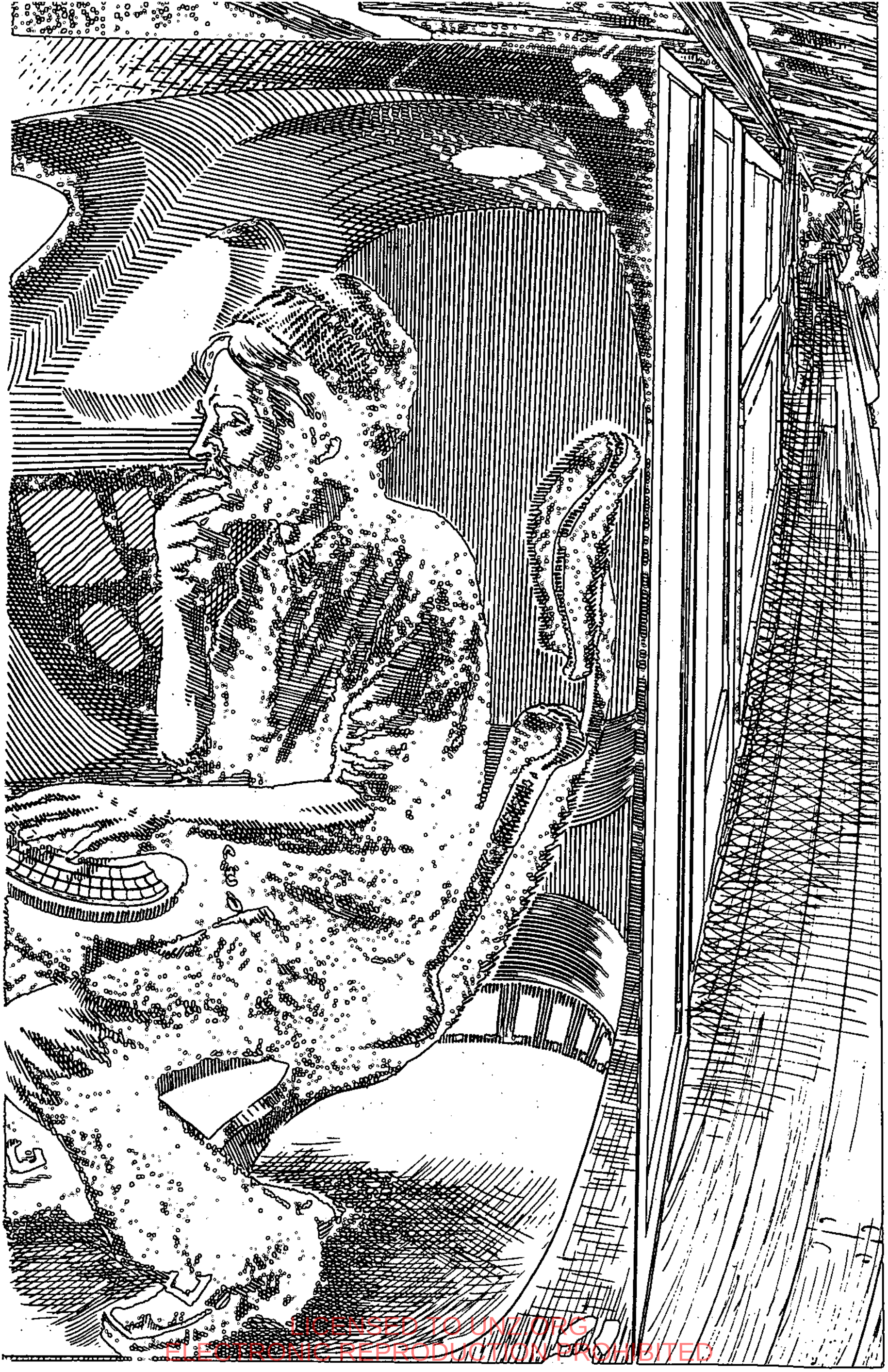
"You're a true friend, Arthur," he told me. "I promise you that the first son Mary and I have will be named after you."

Startled, I could only blink at him and smile wanly. Then I hustled off the forward hold.

The database told me no more than I already knew about Charley and Maureen Dunbar. Some sources said they were married, though one indicated there was some scandal about the timing of the birth of their first child, others said she was his mistress and the child, Arthur Llewellyn Dunbar, was born out of wedlock. I had difficulty seeing Mary MacCormac as anyone's mistress. About Dr. Ian MacCormac the data was no less ambiguous. There was a record of him on the *Essex* up until Bombay, 1805, then he disappeared. Jumped ship, according to the ship's log.

OK, I thought, that was another possibility. Ian *didn't* die; he abandoned Mary out of fear for his own life.

Right. And dragons fly daily out of LAX. Who was I kidding? Ian would never leave Mary. Not while there was



still life left in him.

Ultimately, as I sat huddled before my Grid comp, bathed in the colored backwash from its uninformative display, I could see only one way to assure both Ian's existence and my own, and I was sitting on it.

"Captain," I said, "we need to talk."

The *Essex* rolled into a long trough and wallowed there momentarily, challenging my sea legs. He hesitated with her, then turned from the helmsman to face me.

"Ah! If it isn't the guardian angel."

"I'm *not* an angel, Charley, and I'm about to prove it."

He eyed me suspiciously. "What are you about, lad?"

I sighed. "I wish I knew. Come below with me a moment. We need to talk."

He glanced at the helmsman, who squinted dispassionately ahead, clutching the wheel in gnarled hands. *Essex* charged up another long wave and teetered at its top.

What the passengers don't know, I thought, *would definitely make them sicker.*

"I belong on deck in heavy weather, boy. But, here. . . ." He moved to the fore side of the mizzenmast and beckoned me to follow him.

I didn't see any errant blocks dangling about, so I did. Then I went on the offensive. "You're trying to kill Dr. MacCormac," I accused him.

He gazed at me steadily. "You think that of me, boy?"

"I *know* that of you. It's got to stop."

"Oh, has it? And can you thwart destiny, then? Is that within your powers?"

"Charley, look. If you and Mary—Maureen—are destined, then you don't need to be doing this to Ian."

"She is currently a married woman, Arthur. I can't wed a married woman and her husband shows no inclination toward abandonment. In fact, he's a most loyal and responsible fellow. Under other circumstances, I'd find him quite likable."

"There are alternatives, Charley."

He nodded. "Aye. I suppose he might sicken and die when we reach Bombay or suffer amnesia in a fall from bed. But why should I wait? What difference how he dies?"

"The difference is, if he dies from natural causes, my an—er—you won't go down in history as a murderer, or at least a suspected one. More to the point, you won't *be* a murderer."

"But I've already murdered Ian MacCormac in my heart several times over, lad." He shrugged. "Damage is done."

"Look, if you could rewrite history as you wanted, what would you have happen?"

He frowned. "You mean history . . . between me and Mary?"

"Yes."

"Well, I'd meet her before he could. Sweep her off her feet. Marry her and carry her off to sea before young Dr. Mac even figured in the story."

"Then Ian wouldn't have to die and you wouldn't be a cold-blooded murderer."

"No, I suppose not. And I'd *never* be a *cold*-blooded murderer." He grinned wickedly.

I took a deep breath. "What if I told

you you could do that—go back in time and meet her first?"

"I'd say you were tetchy from all the pitching."

"The *Warren Hastings*," I said. "Maureen Llewellyn. Need I say more?"

"I believe you can see the future, lad. I *don't* believe you can travel to the past."

"I can. I'll prove it."

"Right and well. Show me a sign. Make the lightning strike the ship and knock me dead."

"Don't tempt me," I growled. "Come below with me. I've got something to show you."

"What? More little flashing baubles invented by your uncle? A whole trunk full of 'em?"

I chilled. Reardon had told him. No, I realized as his hand slid surreptitiously to his coat pocket, Reardon had given it to him. I smiled. Two birds, one stone.

"Something much bigger and better than that," I said. "Come down and take a look."

"Ah, so you can rap my melon and throw me overside?"

"Gee-*zoo*, Charley! What an imagination! I wouldn't harm a hair of your moustache. Not with a shipful of loyal crewmen to tear me limb from limb. That'd be about the stupidest thing I could do. I just want to show you something to convince you I can travel in time."

"Show me here."

"Charley—"

As Providence would have it, we received, at that very moment, a lurid manifestation of that phenomenon known as Saint Elmo's fire. I could not, in my wildest sea-dreams have conjured up anything so perfect. The helmsman called out above the hiss and rattle of wind and rigging and pointed aloft, looking incredibly archetypal. Every man on deck looked up into the darkening sky and smiled. Their patron Saint had blessed them—Bombay, look out.

Charley looked at me suspiciously. "It's beyond the powers of men to bring Elmo's fire."

"Yes, it is," I agreed cheerfully. "Or travel in time, either, I suppose. Or foretell the future."

"All right. Show me your miracle in the hold, Arthur Dunbar. But it had better convince."

We went down into the *Essex*'s forward hold via the aftmost hatch. I had no intention of making my way down an open rolling deck with Black Charley Dunbar on my heels. I sent him down the stairs first and directed him all the way to the forward hatch through O'Hara's carefully ordered cargo.

Halfway to our goal I told him to take out the "bauble" he had in his pocket and use it to light our way. That rattled him a little and I felt a moment of giddy power.

"I don't know how it works," he complained.

I heard him fumbling for it and removed it from his possession, then unleashed a flood of soft pink-white light on our surroundings. Shadows loomed and crouched. A few scuttled. They were small enough to ignore, so I did . . . assiduously.

Behind the forward steps we came face to blank face with my Crate. Charley stopped.

"It's a shipping crate," he informed me.

"Is it?" I felt for the palm plate (a crudely stenciled palm tree, no less). It recognized my imprint and activated the door. "After you," I said.

He peered at me intently in the skewed light, then hesitantly slipped into the big box. "Blessed saints and angels!" he muttered as the light, dimmed in my absence, came full on.

The interior of the Crate carried no semblance of crate-ness; it was an ergonomically designed, state-of-the-art piece of machinery with all the attendant frills and furbelows of same—blinking indicators showing time and space coordinates, temperature, barometric pressure, life support readings, oxygen mixture and, of course, the onboard computer console and tactical display. The actual muscle of the thing—the Temporal Grid itself—was tucked out of sight under the flooring. All very impressive, I'm sure, to a man whose idea of hi-tech was a particularly well-oiled capstan and a few extra sails.

"This is-is. . . . What *is* this?" he stammered, making an all-inclusive gesture.

I tried not to let the growing sense of power go to my head. "This is my time machine."

He gazed around the tiny chamber, his eyes lighting on the lettering on the face plate of the Field Generator. "TeGrEn? Sounds like some sort of mythological beast."

"Temporal Grid Enclosure. Time machine to you. Do you believe me now?"

"Where are you from? Are you an angel or a devil?"

"Neither. I'm an historian."

"Ah. A little of both, then."

I ignored the quip. "Do you believe me?"

"How does it work?"

I sighed. "*Reader's Digest* version: We call it Shifting the Spectrum. It takes advantage of the fact that light behaves both as a wave and as a particle."

He stared at me blankly.

"Look, that branch of physics hasn't been discovered yet. Let's skip the explanations."

"What's *Reader's Digest*?"

"Look, do you believe me? Come on, Charley. Do you want to marry Mary without resorting to murder, or not?"

"How will it work? How can I meet Mary before he does?"

"By making sure you're in the right place at the right time. Are you ready to try it?"

He glanced around again, then nodded uncertainly.

"All right. Now, they met five months ago yesterday morning in Manley Park, right?" I settled in over the Grid comp.

"Aye. She fell from her horse."

"All right. Where were you that morning?"

"In town at . . . at a hotel, as it were."

"And you spent the night there?"

"Aye."

"I need an address."

"Very well. Four Dunne's Cottage."

I repeated the address to the computer and was rewarded with a map of the area, its houses and businesses marked as accurately as possible. "Spatial coordinates drawn from Four Dunne's Cottage," I ordered. "Temporal Coordinates: April 10, 1805—twenty three hundred hours.''

''It was the eleventh,'' said Charley. ''They met on the eleventh.''

''I want to have a head start. You're so bull-headed it'll probably take you all night to convince yourself to go along with you.''

''Beg pardon?''

''I'll explain later. Sit down.'' I pointed him to a spot on the floor.

''I can see this contraption wasn't made for comfort.''

I ignored him, crossed my fingers and began a pre-Shift systems check. It was completed in seconds. I sent an emergency-Shift blip to my Shift-Eye and engaged the Field Generator. It hummed. Charley looked concerned.

''Close your eyes,'' I warned him. ''Otherwise you might embarrass yourself.'' First-timers often neglected to do that out of a desire to see the pretty colors generated as their physical reality responds to the Spectral Field. They also often lose the contents of their stomachs. For some reason, I've never done that, but then I'm of particularly hardy stock..

Charley closed his eyes and did not lose his lunch, but he was surprised as hell when I asked him to open them again bare moments later.

''That's it?'' he asked. ''We're back in London? Back in time?''

''Yes, sir. We are.'' I scanned our immediate surroundings. Not pretty. We were a couple of inches deep in water of an unhealthy hue and surrounded by general refuse—broken boxes, stove-in barrels, splintered carriage wheels. We blended nicely into the contents of the alley next to Four Dunne's Cottage. I wrinkled my nose in anticipation.

''Not a good neighborhood. Geez, Charley, can't you afford better than this?''

''I don't need to afford better than this.''

I rose and cautiously opened the door. The alley was empty . . . of humans, at any rate. I will not bother you with what it smelled like.

Together, Charley and I leapt the ankle-deep flood and made our way to the street. I looked up at Four Dunne's Cottage, then turned to my very great great-scoundrel.

''This isn't a hotel, Charley. It's a brothel.''

I convinced him that he had to be the one to go in and bring himself out. He knew his own habits, I argued. Knew which lady he favored. Besides which, what could be more convincing to him than meeting himself face to face?

''If I came to you and told you this wild story, you'd think I was crazy, wouldn't you? But if *you* appear and tell, well—him—''

''I'd think *I* was crazy.'' But he was nodding. ''All right, Arthur. Your point is well taken. Are you sure there will be no deleterious effects?''

''Hollywood stuff,'' I promised. ''No one has ever expired upon seeing their own past. It's not recommended, but hardly deadly.''

He gazed at me, brow furrowed, then squared his shoulders and marched purposefully to the front door of the house.

''Don't get lost in there,'' I called.

He emerged only ten minutes later with himself in tow. *Thank God,* I thought, *they're wearing different clothes.* At least I'd be able to tell them apart.

They were arguing—I should be surprised—and gesticulating wildly almost in unison. It was like watching a synchronized mime team. I shook my head and trotted over to meet them at the bottom of the front steps.

"Here, this is Arthur," said Charley-Is. "He can explain about the time box, if you really care so much to know. The important thing, Charley Dunbar, is the woman. You—I—we—must meet Maureen Llewellyn before that upstart MacCormac."

"But I don't want to marry," argued Charley-Was. "I treasure my freedom, thank you, and I've no intention of chaining myself to one woman."

"This is no ordinary woman, dammit. This is Mary."

"I've yet to meet a woman—"

"If you come with us, you *will* meet her. The very woman. Dammit, man, you *have* to meet her. Meet her before she's wed to someone else."

Charley-Was smiled crookedly. "I'd say that's the perfect time to meet any woman—after she's married someone else. Married women make the finest mistresses . . . I'm told," he added, glancing at me uncertainly.

"Charley Dunbar, you mutton-brain!" Charley-Is exploded. "This woman should be no man's mistress! She's an angel! Incomparable! Divine! I near sold my soul to get her. Truth is, I'm not sure I haven't done that anyway. But, to the point—she's married to some spineless doctor, a man completely unworthy of her. She—"

Charley-Was looked at me blandly. "He do go on, don't he?"

Charley-Is threw up his hands in exasperation. "Mule stubborn! Arthur, you talk to him!"

I was finding it difficult to maintain my composure. "Me? He's you—*you* ought to be able to handle him. You know how he thinks."

"Aye, like a mule-stubborn mutton-brain!"

A movement at one of the facing windows above us caught my eye. "Look people are staring at us. Let's go someplace a little more private."

"Aye, let's show him the box," suggested Charley-Is.

We returned to the alley, but I seriously doubted a crateful of incomprehensible technology was going to make Charley-Was willingly meet his match. Nonetheless, I showed him the Box, as Charley called it, and even demonstrated the disclite. He was impressed, but not enough to give up the life of a happy seafaring bachelor. He had less trouble accepting time travel than he did the idea of changing his lifestyle to exclude Four Dunne's Cottage.

"Did I mention," I said as he examined the disclite, flicking its vari-colored beam on and off against the grimy alley wall, "that Miss Maureen Llewellyn's papa is Llewellyn, Lord Eachan? Or that after marrying her you acquire your own ships and an estate in Hampshire?"

He looked at me with new interest. "No, you didn't mention that. A grave oversight under the circumstances." He glanced at his "twin." "You trust that prediction, do you?"

"I wouldn't be here if I didn't."

Charley-Was gave the matter a long,

hard thought. "All right," he agreed. "Show me this paragon of female virtue. I've always fancied Hampshire."

"Philistine," muttered Charley-Is.

We were forced to take a room in a seedy inn since returning to *Essex* was out of the question. We explained the Charleys away as twins, but assigning them names proved problematic.

"You can't both be Charley," I observed. "Nobody names both twin boys Charley. What's your middle name?"

"It's . . ." began Charley-Is, glancing obliquely at his second. "It's Charles."

"Charles Charles Dunbar? I think not."

"Charles is my middle name," said Charley-Was. "My first name is. . . ." He glanced at Other Charley.

"It's Percival," Is admitted.

"P-percival?" I repeated with as straight a face as possible. I could see why he'd gone by Charley; "Black Percy Dunbar" didn't quite fit the image of a hard-driving East India captain.

"Fine," I said, pointing at Charley-Is. "You're Charley. You're Percival." I thumbed at Charley-Was.

"No I'm not," he objected. "I am not Percival. I have never been Percival. I will never *be* Percival."

"Well, you can't be Charley, because *I'm* Charley," argued Is.

"I'm as much Charley as you are and you know it! Fact, I'm *more* Charley, because I'm Charley *first*."

"Well, I've been Charley *longer!*"

"Cut it out," I said. They ignored me, resorting to battering each other with childish epithets. "Belay that!" I shrieked finally. They stopped yammering and stared at me. I felt like the mouse that roared. "All right, fine. Nobody has to be Percival. You're Charley and you're . . . Farley. Parents might do that to twin boys."

Charley-Is was livid. "But *I* should be Charley! Why should he be Charley? After all I've been through—"

I gritted my teeth. "You want the girl? Let *him* be Charley." His mouth popped open to protest. "End of discussion," I said, quoting my mother. Farley glared at me and went off to sulk while Charley and I registered with the faded concierge.

Bright and early the morning of the eleventh we were at the fated park. Dew sparkled in grass that was just awakening from winter. The breeze was crisp and chill—vigorous, I guess you'd say—and Charleys were frisky.

So, as it turned out was Miss Llewellyn's mount. It was, appropriately, a red, red roan. A Strawberry, indeed, on which she in her vivid green habit, was the stem. They came toward us along the bridle trail, Mary nodding to passing acquaintances, Strawberry doing the same. When they were about one hundred yards off, the horse, just as Mary had said, took violent exception to another lady's plumed hat and exploded into a wild gallop.

I glanced around quickly and saw, behind us, the ill-omened gaggle of white geese and, coming down a garden path to our left, Dr. Ian MacCormac. His eyes were glued to a thick leather-bound volume he carried in both hands, while an umbrella dangled from one arm, his medical bag from the other. He reminded me, oddly, of my father—the books were different, but the posture was the same.

How archetypal of him, I thought and nudged Charley-Was. "Get after her, Charley, or you'll lose her to the doctor all over again."

Both Charleys glanced around and spotted their rival, both made sneering faces, both lunged toward the oncoming runaway. I snagged Charley-Farley by the coat tails.

"Wait your turn, fella."

We watched as Charley-Was raced to the bridle trail, stepped manfully into the path of the on-rushing Strawberry and masterfully manhandled the poor beast into speedy submission. He literally dragged it to a stop—one thick hand on its nose, cutting off its air, the other bracing the rosy-cheeked young lady in her side-saddle. That done, he had only to help her dismount and stand by to receive her commendations.

"I cannot thank you enough, sir," she said breathlessly, gazing up into his dark, bearded face. "This silly creature has an untoward manner of expressing fashion sense." She indicated the bobbing crests of the now distant hat.

Charley-Was looked after it, then threw back his shaggy head and laughed. "But sense, it has, miss, for all it near got you killed. That hat is atrocious! Are you all right or shall I call a doctor to see you?"

"Doctor? Good God, sir! Do you take me for a china doll? What I need is a harness-maker to sew up a set of blinkers for this beast." She rattled the horse's bit and gave it an affectionate pat on the neck.

Charley-Was stood mutely, the most besotted smile I have ever seen creeping from beneath his moustache. Even from here I could tell he was hooked; my future was assured and Ian MacCormac would live. Charley-Is, however, did not look happy. In fact, he looked like a man about to fly into a white-faced rage.

"That mutton-headed scum! How dare he ogle her that way?"

"Don't you mean, how dare *you* ogle her that way?"

He spluttered futiley for a moment about hand-kissers and randy old sea-dogs, then subsided as the young lady favored his former self with a brilliant smile.

"Such gallantry shouldn't go unrewarded," she told him. "My father will most certainly wish to meet you and hear how you saved his daughter's silly neck. Won't you please come to tea?"

"No reward is necessary, dear girl, but your assurance that you are as fit as you look."

"I am quite fit," she assured him, promenading in a small circle. "But I should like some help getting this over-excited animal home. By then, it should be just about tea-time."

The over-excited animal in question yawned exaggeratedly but was soundly ignored. Mary-Maureen Llewellyn and Percival Charles Dunbar, smitten beyond hope, walked off arm in arm, trailing the docile Strawberry.

Charley-Is gazed after them, his black heart in his eyes. "Will I remember?" he asked me. "When we get back to *Essex* will I remember the months I'll have had with her?"

"Eventually," I said. "But you've been out of your time stream. Everything has to . . . settle into a new pattern."

He gave me a blank stare, then looked after the retreating lovers.

"Come on," I said. "We're finished here. Besides, the faster we get back—"

That got his attention. He grinned at me, then took off in the direction of our distant alley. I followed with a last glance around the park. Early morning London wasn't too bad, really. In the dewy freshness before stoked coal fires filled the air with smaze, it was really quite pretty.

As I turned to go I saw Ian again. He was sitting on a low wall, umbrella at his feet, medical bag in his lap, book flopped open across its handles, the pages rippling, unread, in the breeze. He was a forlorn figure—not at all the good-spirited man I remembered from the *Essex*. As I watched, he sighed so deeply, I could see his shoulders heave. The breeze gusted black, ill-mannered curls into eyes that were fixed on a distant point—the point where Charley and his lady had disappeared.

I had a sudden conviction, as Ian MacCormac rose and slunk away, that this was not the first time he had taken an early morning stroll across this particular bridle path.

By the time we'd Shifted back to the forward hold of the *Essex*, Charley Dunbar was nearly beside himself (no pun intended). But somehow, the close, cold, creosote-soaked atmosphere of the *Essex's* belly had a sobering effect on him. He took the steps topside with measured stride, only the clenching and unclenching of his fists betraying any nervousness.

We found Mary-Maureen on the poop deck, gazing out over the stern. The same brisk wind that snapped the sails and plucked the shrouds, whipped bright streamers of hair about her face and fanned her cheeks to rose flame. She was beautifully animated, in the throes of lively conversation with her companion.

I felt as if my feet had frozen to the deck. The man she sparkled so for was Ian MacCormac.

Beside me, Charley uttered a low growl that turned my blood to ice. "Damn you, Arthur Dunbar. You promised me. You *promised* me. And here she is with her doctor husband. I shall kill you, Arthur, and feed you to the fishes."

Mary turned just then and saw us; Charley, beet red, me, shade pale. Her eyes fastened on Charley and across her face spread the most radiant dawn of a smile I have ever seen.

"Darling!" she exclaimed and I knew profound relief that Charley would not have to kill me after all. She crossed the deck in quick, graceful steps and threw herself into the captain's outstretched arms. "You disappeared for so long, I thought you must have fallen overboard. If dear Dr. Mac hadn't been so gallantly occupying my time, I'd have worried myself sick about you, what with this past week's goings on."

She pulled away a little and gazed up at him, framing his face with her hands. "Dear man, I think that between Arthur and I, we shall have to watch over you day and night until we reach Bombay. We won't let anything happen to him, will we, Arthur?"

I nodded absently. It was obvious that

Charley hadn't heard a word she said. He was too busily worshipping her with that ludicrously beatific grin that just seemed to wriggle into a man's lips when Mary Llewellyn turned her green eyes on him. And for that reason, he also failed to notice the look on Ian MacCormac's face. It was also an expression I had learned to associate with the young lady. It said there was rat poison in the captain's brandy, sand on the hold steps, and at least one loose cannon aboard the *Essex*.

That was two days ago. Since then, Mary and Charley have watched each other, Ian MacCormac has watched Mary and Charley, I have watched Ian MacCormac and, so I don't feel at all neglected, Mr. Reardon has watched me. I check the historical lines daily by computer; every day they tell me the same thing: that something important will happen in Bombay and that my ancestry is even more dubious than I previously suspected.

As I see it now, I have several options. I can stick around and keep Black Charley Dunbar under close observation for the next several years or so . . . at least until he produces a male heir and names him Arthur. Or I can make him return to the Park, put things back the way they were, and let Fate take its course—which probably means that Ian will die and Charley will have his Maureen and she will give birth (suspiciously soon) to a son that is probably not Charley's after all. In which case, she will name him Arthur because it's what Ian would have wanted and . . .

Then again, I could just wash my hands of the whole affair, hightail it back to 2115 in my ersatz shipping crate, and pray that *someone* will produce a son named Arthur, who may or may not be a Dunbar.

I am confused.

And I'm in trouble. There is the matter of that unauthorized Shift back to April and I seriously doubt my "emergency" would hold up to any serious scrutiny. After all, I was supposed to be observing history, not creating it.

But, looking on the bright side, I'm also in a unique situation: I am probably the only person in history given the opportunity to choose his ancestors.

As I said, the best-laid plans of Arthur Dunbar ne'er gang agley—or at least they so rarely do that it doesn't count. Not really. ■

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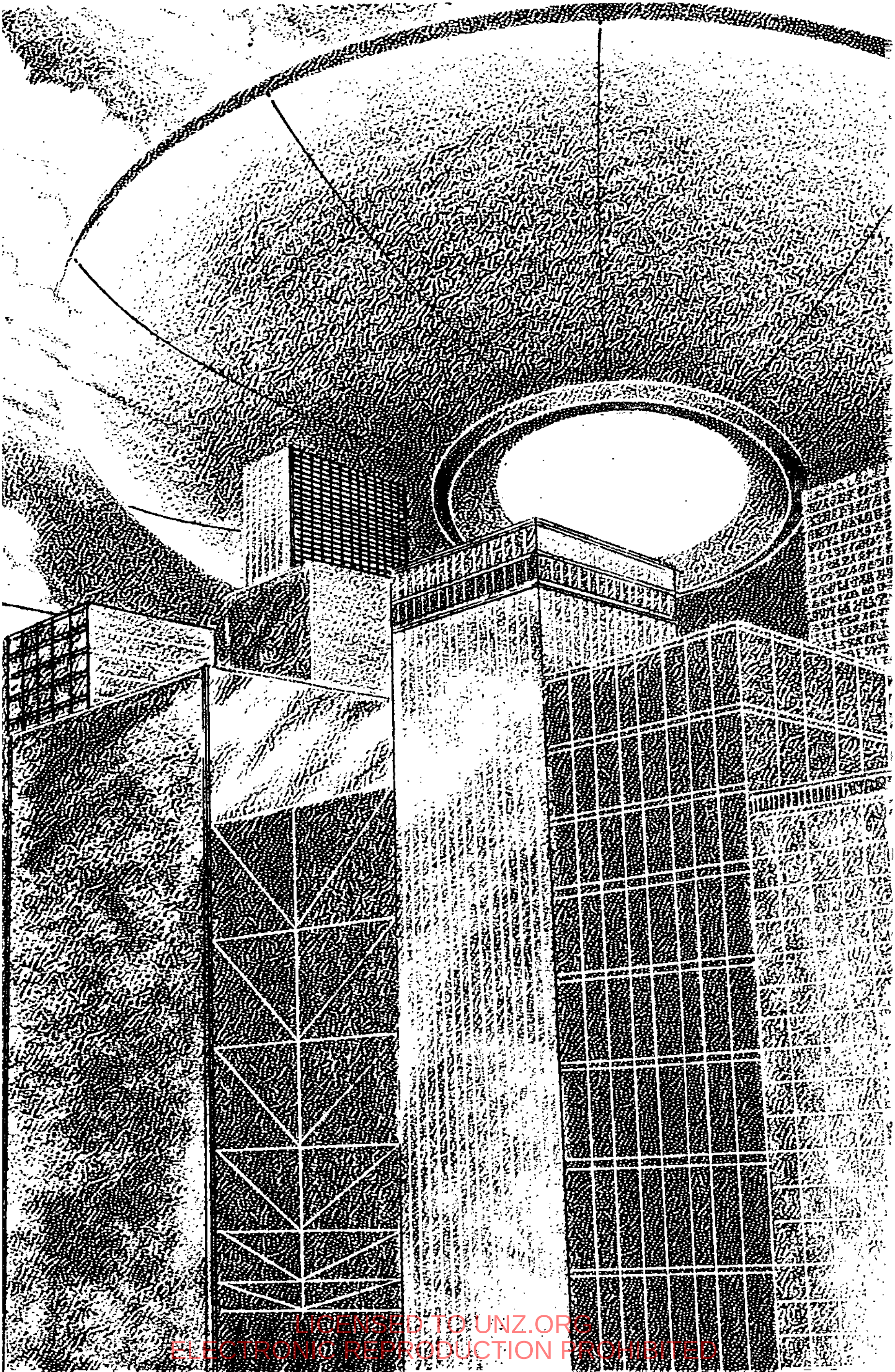
STREETWISE

Bill Johnson

The difference between a problem and an opportunity is in the eye of the beholder!

William R. Warren, Jr.



I loved December.

A hard sleet pelted off the Sound and coated the streets with a treacherous glaze. City maintenance trucks were out en masse with salt and sand. I smiled while I stood on the curb and watched the rotating blades on the back of the trucks spin and twirl like Buddhist prayer wheels as they spread the mixture.

"What are you grinning about?" Matz snarled. He was the city attorney in charge of defending the streets and maintenance department against lawsuits. He tugged his collar higher and gripped his case more tightly. We were both fresh from court, my client off to the city clerk to collect his check, Matz to city hall to massage his bruised ego.

"I smell money in the air," I said.

"You know what a day like this does to the city streets?" Matz asked. He shook his head. "Of course you do."

"Water, water everywhere," I said. "Then the water freezes into ice. Ice expands.

"Little cracks become big cracks. Big cracks turn into holes. Holes turn into potholes. And potholes," I said smugly, "turn into nice piles of money."

"You're sick. You know that? You're sick."

"Potholes are my business," I said defensively. "And business is good."

"Your business is making my life hell."

"Then fix the streets. No more potholes, no more lawsuits," I said.

"Fix the streets. Fix the streets," he mimicked. "You make it sound so easy. You know how many kilometers of street there are in this city?"

"Eighteen thousand, two hundred forty-two point three kilometers. Paved. I don't count the unpaved."

"Because there's no money in them. You can't sue over a hole in an unpaved street."

"I believe you've got the hang of this," I said.

"The city cannot afford to fix every pothole in the roads. We cannot afford to pay off every motorist who runs over a pothole. We don't have that much money, and every year it seems to get worse," Matz said. "You're bankrupting the city."

"There's a story about that," I said philosophically. "How many city employees does it take to fill a pothole? Four. One to shovel and three to watch the pothole and make sure it doesn't run away. Hell, don't tell me I'm bankrupting the city. Tell the public employees' union."

Matz shook his head.

"I'm not that crazy. One out of every five voters in this city is a civil servant. So there are a lot more of them than there are of you. And I have to get my boss reelected this year," Matz said.

"Then I'll see you in court," I said.

Matz scowled and whistled for a cab. I stepped back to keep the slush off my shoes as the cab splashed away.

I looked up at the sky, then back at the salt truck, then down at my feet. The concrete in the road was crumbling in one spot, a baby pothole forming.

I loved December.

I hated June.

It wasn't just the warm, dry weather. There were still plenty of potholes left from the winter.

It was the city council.

Matz phoned me about an hour before the vote. You could call it professional courtesy, one lawyer to another. I called it something else as I hustled over to city hall, just in time to see the council pass an ordinance that put me out of business.

"Lawsuits are still fine," Matz said later over a beer. "No one is being denied any due process. File all the lawsuits you want. I'll be happy to defend the city."

"Not fair," I said bitterly. "Under the old law, if a person or their property was damaged by a pothole, they could sue the city."

"And they still can," Matz said smoothly.

"Like hell!" I said. "Your new ordinance makes it almost impossible. Now, if the city knows about the pothole *and* doesn't fix it, *and* the victim can provide proof that the city was notified, *then* the victim can sue for damages. If the victim can't prove the city had been notified, then the city can't be sued."

"Sounds fair to me," Matz said.

"Who the hell keeps a list of potholes for a city this size?"

"No one that I'm aware of," Matz said.

"Then how the hell do I prove the city was notified?" I said.

Matz finished his beer, hesitated for a moment, then ordered another. I covered the top of my glass with my hand and shook my head when the waiter came over.

"That might be a problem for you," Matz admitted. "I imagine it *will* cut down on the number of lawsuits filed against the city."

"You can't do this to me!" I wailed. "I've got to pay alimony for the first wife. Then there's alimony for the second wife. My car lease. My office lease. The house mortgage "

"You sure you don't want another beer?" Matz asked.

Three months later the only office I could afford was small and cramped, and the furniture the kind that even Goodwill wouldn't accept. The wall decor was basic Army green on peeling vinyl. My secretary was a voice on an answering machine.

My business was a data base I kept on the location of potholes in the city. I paid off my informants at three potholes for a dollar. I then reported the potholes to the city, and hoped someone ran their car into the pothole before the city patched it. Other lawyers paid me for access to the data base, to check out their client's claims, and I used it for the few cases that came my way.

My clients were your basic contingency cases, where if I won I got a percentage of the award. If I lost, I got nothing.

In a contingency case, the credibility of the victim was more important than anything. My problem was, most of my clients looked about as credible as their lawyer.

We lost a lot.

My newest client seemed different. He was slightly built, about six feet tall. Brown hair and eyes, regular features. No visible scars, tattoos, track marks, gang symbols, or other identifying marks. He wore faded blue jeans and a flannel work shirt, both clean, and his eyes were clear and focused.

This one had possibilities.

"How can I help you, Mr. Madden?" I asked.

"It's my truck," he said in a light baritone. "I hit a pothole yesterday. Ripped the hell out of my oil pan and bent my front axle. I've got the repair estimate here with me."

He reached down and pulled the estimate and the accident report out of his back pocket and handed them to me. I ran the address off the accident report through the computer.

First, the good news.

The address was for a warehouse and parking lot; both were private property. And anyone who didn't keep up their property, who negligently left potholes in their parking lot, was most eminently liable.

Second, the bad news.

The address was listed as a diplomatic property of the Brak. And the last time I checked, we were still technically at war with the Brak.

I thought for a moment, stared at my beautiful and spacious office, and shrugged. I turned to Madden, shook his hand.

"Mr. Madden, we're going to get your car fixed up just fine."

I got my camera out of hock, and headed for the address on the accident report. It was an industrial district near the waterfront, row on row of old warehouses behind chain-link fence topped with double coils of razor wire.

The access road was terrible, the worse I'd ever seen for potholes. It seemed like all the asphalt was crumbling, and the raw mud of the roadbed oozed through the cracks in the road. Then, just when it seemed it couldn't get any worse, it did. In fact, the road got progressively worse as I drove deeper into the district.

I finally stopped outside the address Madden gave me. I saw an old two-story warehouse, a faded advertisement painted on the side, with a low slung yellow brick office building attached to the front. The window frames on the office were painted white, and needed some touch up work.

Stacks of wood shingles lay on a tarpaulin spread out over the parking lot. A ladder was propped up against the side of the office building next to the shingles. The gate to the parking lot was rusted metal, wedged off to the side of the entrance. The NO TRESPASSING sign hung at an angle from one hinge.

I stared at the shingles for a moment, then shrugged. I paid for wood shingles on the house my first wife now lived in. I remembered how the bill for the shingles raised my blood pressure. I'd never heard of someone putting them on a warehouse.

I looked around for security, the usual men and women in dark suits and little earpieces. Nothing. Which meant either that the security was better than I'd ever seen before, or the Brak meant it when they said they wanted to be alone. Either way, I had a job to do.

The parking lot was empty, except for two old cars parked next to the warehouse. The lot was asphalt, the paint that marked off the parking spaces was faded and stained. Several large potholes in the middle of the lot looked promising. I checked to make sure the lens cap was off, and started taking pictures.

The camera was one of those instant jobs, with a legal lock-seal so you couldn't double-expose the negative, or modify the pictures. I remembered one of my favorite cases where the photographs, the best evidence against us, were taken with a digital camera.

The judge was leaning pretty heavily for the other side in the case, based mostly on those damned pictures. I remembered a lesson from law school, where I was taught that if you couldn't attack the case or the witnesses, attack the evidence.

I hired a local computer hacker to show what you could do with a digital photo. Maybe I didn't choose the most tasteful person I could find, but it worked. When the judge saw how you could modify a digital photo, he threw out the evidence and I won the case.

I understand the boys down at the DA's office still have that pinup of the judge's head on the nude dancer's body. . . .

"What are you doing?"

I've jumped higher, but I was younger then. I closed my eyes, took a deep breath, and turned around slowly.

He was medium height, brown hair, brown eyes, medium weight. His complexion was medium, neither black nor white. His features were regular. He was the kind of person that was not only unrecognizable in a crowd, but was essentially invisible.

He was the blandest person I had ever seen.

He scared the living hell out of me.

The Brak appeared one day out of nowhere, a fleet of ships that hovered over every major city on Earth. We tried to contact them, and were ignored.

For exactly one day.

Then, they went to work.

First, they destroyed exactly half the satellites in orbit. Second, they dropped asteroids on the Sahara until they reached the artesian water level. No one was killed, and the Tuareg nomads happily discovered they were now the possessors of several new oases, but the obvious point about their superior technology and military power was made.

Third, they declared war on us.

We promptly surrendered.

Our surrender was refused.

We attacked.

Missiles blazed away, fighters bored in for suicide runs, lasers fired, particle beams roared.

They brushed the attacks away, so easily that we didn't even suffer any casualties.

Negotiations began, and ended. Every Brak spoke English and French and Russian and Japanese and Spanish and every other language on Earth, but nothing they said made sense.

The Brak always appeared as humans, but after the first assassination attempt blew away the ambassador's arm, and she calmly screwed it back on, we tended to believe the bodies might be disguises.

We asked why they had attacked. They replied they had *not* attacked.

We walked out of the negotiations, and prepared to die.

Their ships stayed above our cities, and did nothing. Gradually they faded from the news, became part of the scenery, and we learned to ignore them.

Every few years a reporter or diplomat would track the Brak down, in the buildings they rented in every major city, and see if anything had changed, if the Brak were ready to negotiate.

Nothing ever changed.

But all I had to do was look up in the sky and notice the glint of sunlight off the ship that hovered there, silent, but never forgotten. . . .

"I asked what you're doing here," he said.

"Pictures," I said, and began to back toward the gate and away from him. "Just taking a few pictures."

"This is private property," he said.

I stopped.

I could turn and run, or I could do my job. Madden was the best client I'd had in months. Besides, my life wasn't that great anyway.

What the hell.

"I'm a lawyer," I said. "I represent a worker who broke the axle on his car in that pothole. He was here to shingle your roof."

"A lawyer?" he asked warily. "Not a diplomat? Not a reporter? A lawyer."

"A lawyer," I agreed.

"You represent the roof man. He did not finish the job," he complained.

I pointed to the stack of shingles, and then to the parking lot.

"He had to buy the shingles, then he busted the axle on his truck working here. He spent all his money on the shingles, and now he can't fix the truck," I said. "If the truck doesn't work, he can't work."

"He must finish the roof," the Brak insisted. "He is in violation of his contract."

"No," I said, angrily. "*You* are in violation of *your* part of the contract. When you hired him you implicitly agreed to provide safe working conditions. Look at this mess. You must pay for his axle, then he will finish the roofing job."

"You understand implicit agreements?" the Brak asked, surprised.

"You're damned right I do!" I said.

The Brak stared at me for a moment, then nodded.

"None of the diplomats understood implicit agreements. Everything had to be explicit. We thought you were all the same. Yes, there was an implicit agreement with the roof man," he agreed. "My name is John Smith. Come with me inside."

We walked across the parking lot to the office building. He opened the door. I hesitated, waited for the bright alien lights, the strange and exotic odors, or anything else that I'd seen on late night holovision movies about the Brak.

Instead, the inside was decorated in early university student. There was a cot with empty pizza boxes on the floor next to it, a holovision stand at the foot of the bed, and enough dirty clothes on the bed itself to open a laundry. Beside the bed there were several filing cabinets. A folding card table, covered with blueprints, and a pair of metal folding chairs finished the decor.

"Sit down," the Brak said. I dumped papers from one of the chairs onto the floor, and sat at the table. He went to one of the filing cabinets, unlocked it, grabbed a ledger book, and came back to sit across from me.

"How much?" he asked, and opened the ledger book.

I thought about it for a moment, took the amount I knew Madden hoped for, reduced that to the amount he really needed. I doubled that for my fee, then doubled it again to give myself some bargaining room. I came to a moderately ridiculous number. I told John the number.

"Done," he said promptly, and wrote me a check.

I stared at the check, and cursed myself for an idiot. I would have doubled the number again, if I had known it was going to be this easy.

But it was never this easy.

Something was wrong.

I wondered how far up the check would bounce.

I handed the check back.

"What's the matter?" he said, puzzled.

"Certified check," I said. I stood. "I'll be back tomorrow. Say about noon."

He opened his mouth to speak, thought about it, and shut his mouth. He nodded. He smiled, and seemed pleased.

"And I'd get that parking lot fixed unless you want to see more lawyers."

The parking lot was beautiful.

I stopped, checked the address again. It was correct. I looked behind me at the road, more pothole than asphalt, then back at the parking lot.

It was smooth, not a crack or a ridge. An absolutely pure black. No, not absolutely black. I tilted my head, tried to catch the sun on the asphalt.

Magenta.

The parking lot definitely had a magenta tinge.

I drove onto it, up to the office building. I parked, got out of the car. I patted the surface of the parking lot.

It was silky smooth, almost slippery.

I heard something fall out of the car.

I turned in time to see one of my kid's science marbles, a magnet in a plastic shell, roll off the car seat onto the parking lot. He always lost them in the car, and then they fell when we got out and the flimsy plastic broke and he'd cry some more. I hated the damned things.

I winced as it headed for the asphalt.

It floated.

It bounced, sure, but I was positive it never touched the asphalt. It floated, about an inch off the surface, and started to roll under the car. I dove and caught it before it was gone.

The marble was normal, a cheap red plastic shell over a magnet. I shook it, heard the magnet rattle inside. I knelt on the asphalt and gently let the marble go.

It floated.

I picked it up, then held it in my hand and tried to touch the surface of the asphalt with the marble.

Not a chance.

At an inch above the ground, the marble floated. But the closer I forced it to the asphalt, the more resistance I felt. I put my whole weight behind it, and never touched the surface.

I scrambled inside the car, dug into the gaps where the car seat and the back met. I found two pennies, a wad of aluminum gum wrappers, and two more marbles. I dropped everything on the asphalt.

The pennies bounced, then lay there. The gum wrappers made either a mess or an artistic statement on modern man as they lay on the asphalt. I called it litter.

The marbles floated.

Scientist I am not. But I had friends who were. I knelt, took out my Swiss army knife, and shamelessly vandalized the parking lot to get a sample.

Something here smelled like money.

"How much do you want for this?" Waldner asked.

I had stalled off John Smith with a phone call, a hoarse cough, and a lie about my terrible bronchitis. I sealed the asphalt I took from his parking lot into a plastic bag and sent it off by courier to Waldner's lab. He called me back about an hour later.

"What is it?" I asked.

"Buckyballs. This sample is all full of them, linked in with regular asphalt. And I've never seen anything that looked even close to this mess."

I counted to ten. Larry was a good guy, but he spent too much time in his lab. He had six kids, so I figured he must know something other than lab coats and solvents, but sometimes I wondered.

I knocked the receiver on the top of my desk.

"Hello," I said. "Bad connection here. I don't understand."

"Don't do that," he replied testily. "I hate it when you do that."

"Buckyballs," I reminded him.

"Buckminsterfullerene. A very particular family of carbon molecules. The most common form is C-60. The carbon atoms link together so that the molecule looks like a soccer ball, like one of those old-style geodesic domes. The inside is even hollow. We call them buckyballs, for short," he said. "Even have a pretty color. A nice magenta."

"How very nice for them," I said.

"They're very hard. Resilient as you can get," he said. "Fire them at a steel barrier at twenty-five thousand kilometers per hour. They bounce right off."

"The next time I need to launch something into orbit I'll remember," I said. "What about the magnets? Why did they float?"

There was a pause at the other end of the line. I heard Waldner shuffling papers.

"Buckminsterfullerene is a superconductor," he said. "Bring a magnet near a superconductor, and the superconductor will produce an opposing magnetic field. It's called the Meissner Effect. It's what the Japanese use to support their mag-lev trains."

"Oh," I said. Visions of my ship finally come in broke sail in my mind, and I reluctantly waved them good-bye.

"Well, Larry, thanks. I owe you a beer next time—"

"Buckminsterfullerene is a superconductor at 18 degrees above absolute zero," he said.

I stopped. I checked the thermometer outside my office window. I checked for flash-frozen pedestrians.

Not one in sight.

"Larry, it was in the mid-seventies, Fahrenheit, when my marbles floated."

"I know. I tried a magnet on this sample. Definitely a room-temperature superconductor."

Visions of wealth returned.

"This will make me rich?" I asked hopefully.

"Nope," he said.

I sank the damn ship.

"We've developed better room-temperature superconductors. This stuff would never make a decent wire, for example. But someone did some interesting chemistry to make it out of buckyballs. It's a wonderful oddity, but that's about it,'' he said.

I thanked Larry and hung up the phone. I called John Smith back and told him about my miraculous recovery. We set an appointment for the next morning.

I took the certified check and checked the amount. Everything matched. I stood to leave.

''Mr. Madden will be back to work tomorrow,'' I said.

''It is very good when an agreement is reached,'' Smith said. ''From implicit agreement to explicit agreement. This establishes the rules. Everyone must follow the rules.''

We walked outside.

I noticed the parking lot was still perfect, the access roads even worse than ever. I shook my head.

''How did you do it?'' I asked. ''How did you fix this so quickly?''

Smith stopped. He looked puzzled.

''It was our responsibility to fix it. The roof man's vehicle was damaged,'' he said. ''The virus was our responsibility. We used ship construction material to repair the area.''

I stopped.

''Virus?'' I asked.

Smith looked embarrassed.

''A supply ship to our embassy had an accident with one of the weapons systems. A low grade virus, which attacks hydrocarbon-based products, was released. It dissolved the roof on our building, and damaged the parking lot,'' Smith said. ''This is why we need the wood shingles on the building.''

''Did it ever make it into the city?'' I asked.

''Impossible,'' Smith said. ''The virus was localized. There is no chance it made it farther into the city.''

Before I specialized in accident claims, I did a lot of work in personal injury cases. All right, all right. I was an ambulance chaser.

I tried to imagine the ways a virus could spread into the city. I thought of birds, wind, dust, tire wheels, shoes, and several other ideas.

I explained this to John.

''This is more implicit law?'' he asked. ''Nothing can be explicitly proven to us. In fact, we can prove the virus could never have spread beyond this small area.''

''Nothing explicit,'' I said. ''But the *possibility* that you were involved, the need to prove your innocence, the need to remove the cause and effect of the negligence, all these can be used against you. And proof is a very, very interesting commodity. Particularly in the courts, when lawyers and judges begin to work on it.''

''So the cause and effect must be removed?'' he asked, puzzled.

''Absolutely,'' I said. ''That would surely make the entire situation easier on you. But you also need a lawyer.''

Smith stood silent for a moment, an absent look on his face. Then he shrugged, shook his head.

''When two species meet, rules must be established. Rules must be followed. They cannot be negotiated, or flexible. They must be rules that both species agree upon,'' Smith said earnestly. ''Such rules are the implicit pillars of future cooperation. The role of law is to build on these rules."

He sounded like one of my old law professors, but I agreed with him. Our laws aren't built on negotiations, or explicit declarations. Our laws are built on the implicit rules of society, what we called, in law school, the social compact.

"Come back tomorrow," he said. "We need to talk."

A hard sleet pelted off the Sound and coated the streets with a treacherous glaze. City maintenance trucks were out en masse with salt and sand. I smiled while I stood on the curb and watched the rotating blades on the back of the trucks spin like Buddhist prayer wheels as they spread the mixture. Behind them the streets were so clean and smooth.

And such a lovely shade of magenta.

"What are you grinning about?" Matz snarled.

"I smell money in the air," I said. "Eighteen thousand, two hundred forty-two point three kilometers of money. Paved. I don't count the unpaved."

"That's fine for you and your friends," Matz complained. "What the hell am I going to do with all these streets? I never asked the Brak to fix every street in the city. I never asked them to get rid of the potholes. No, not me. And the damned stuff is so tough it'll take years of salt and sand before they start to pothole. Fine. I'm so very pleased. And what's in it for us?"

"You save all those employees salaries," I pointed out. "You balance the city budget."

"I save all those *voter's* salaries, because they're unemployed," Matz said. "Those *voters* will remember which administration put them out of a job. And the damned budget doesn't have a vote."

"You know, I've thought about that," I said. "It would seem to me that the city might need more employees now, not less."

"I'm listening," Matz said.

"What's the biggest industry in this city?" I asked.

"Tourism," Matz replied promptly. "Bigger than anything else. Conventions, the museums, the theatre district. Everything pulls in tourists."

"And, thanks to the Brak, you have a unique tourist attraction. Every street in this city has been fixed by them, every pothole fixed," I said.

"Makes it hard for us to sue them for letting that virus loose," Matz admitted.

"Amazing coincidence, isn't it?" I said. "So now every street in the city is a superconductor. Anything magnetic will float. Anything. If you took the wheels off a skateboard or a roller blade or a car, for example, and put magnets on it, it would float. It would be one hell of a tourist attraction. Of course, people might fall and hurt themselves. It would have to be strongly regulated, and that would involve administrators to hand out licenses, patrols to enforce the rules and hand out tickets, lawyers to prosecute violators . . ."

Matz looked thoughtful for a moment, then smiled.

"What about you?" he asked. "No more pothole cases."

I shrugged.

"The Brak want to reopen negotiations with us, to make explicit our implicit laws. Once they know those, and understand us, the real negotiations will start," I said.

"And you're going to work for them," Matz said.

"A client is a client," I said. "And every client deserves a lawyer."

Matz nodded.

"Seems a shame, somehow," he said. He pointed to the streets. "All this due to you, and you don't get anything out of it. How sad."

He smiled and walked away.

I looked back at the salt trucks, and dreamed about personal injury lawsuits.

I had a good job with the Brak.

But, perhaps, just a little work, on the side. . . .

I loved December. ■

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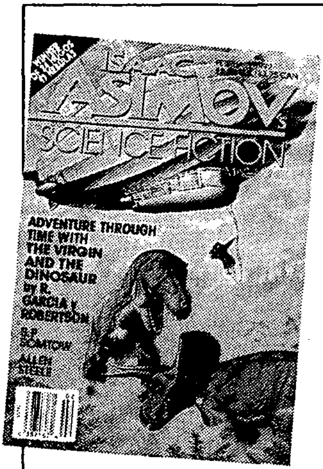
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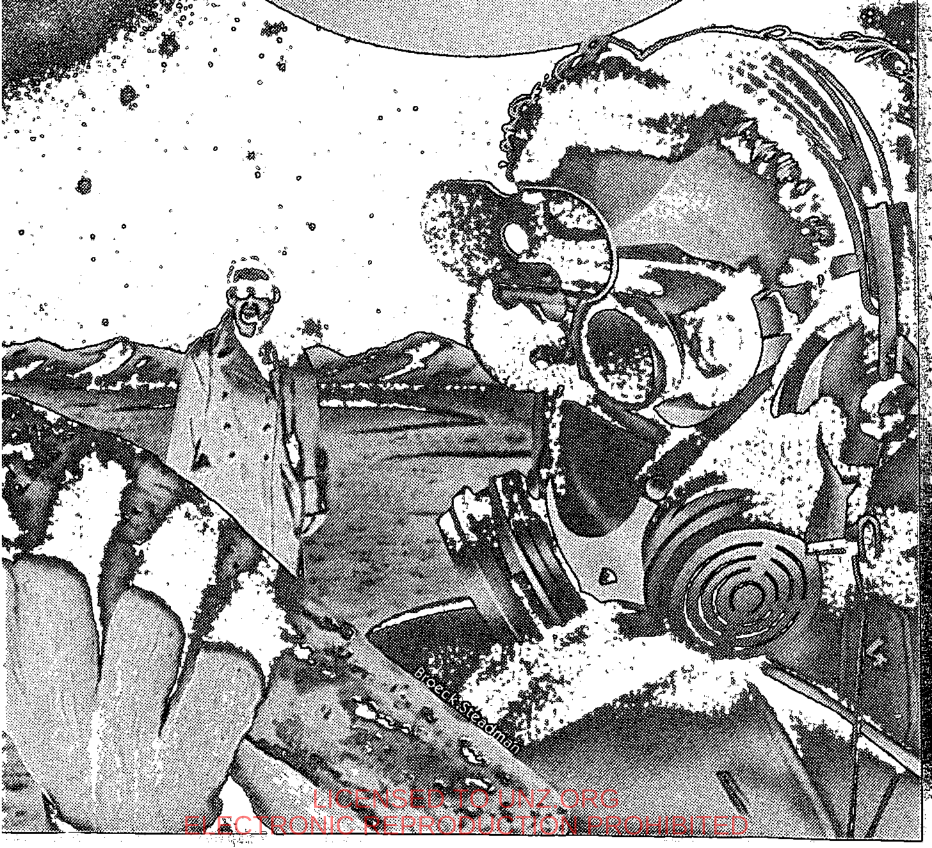


Broeck Steadman

Trev LZalle straightened his wool coat and cast a weather eye up and down a narrow gulch four meters deep and littered with gray, stony rubble. A century of terraforming had given Goddard enough atmosphere to breathe, but not much water. Dry wind over dry regolith; its sandstorms had killed one man already.

But he'd been free here.

Over the gulch's jagged rim, the sky shone pale dusty blue through his UV-protective goggles, with no hint of a blackening gray that could sweep down in minutes and send him scurrying for the colony hovercopter. Part of a small fleet abandoned to the colonists, the copter needed to be flown occasionally, just to maintain it in working order.

Colonial needs matched Trev's perfectly today. After months of hiding at this isolated outpost, he'd seized one last chance to get out in the Wild. His father had come to take him home; not just back to Venera, but into the family business as Blase's puppet progeny.

He stared up the oddly straight gulch. Ten meters back toward the copter, his father and an aide crouched over a pile of gray rocks. With both of them wearing their coats hood-up, it was difficult to tell them apart.

Refreshing, that. Surgically reconstructed five times over the past twenty-two terrannums, Blase LZalle's ever-changing voice and appearance kept him popular with fickle fans on Venera, Earth, and Mars, and in the orbital habs of four systems. That much was fine, but everyone from Sol to Eps Eri knew Blase had married for perfect genes. Trev's grotesquely blotched face, wiry hair and eyebrows, and one ear noticeably higher, proclaimed that Blase's genes did not program for physical beauty.

So before Trev could sing second tenor, Blase wanted him prettied up, too..

Beneath Blase's fur hood showed a fringe of crimson hair and his trademark ebony skin. This terrannum, Blase's chin had two clefts running parallel; an octave doubler lay implanted alongside his Adams-apple; oh, and mustn't forget the guitar pick where a thumbnail ought to be.

OK, so he really could sing. Trev had a hot voice too. Mentally, Trev shuddered. He'd seen the performing lifestyle: sycophants and endless tours, gaudy castles that crumbled with one bad gig. It would spell the end of his privacy and his self-respect, of acceptance for what he'd accomplished without anyone's leg up.

Or was it the plastic surgeon's laser he feared?

He ducked out of powdery-smelling wind and spotted one of the rocks they'd come hunting: hand-sized, flat, and just about the right shape. Fumbling with fur-lined gloves, Trev slipped a noose of copper wire off his wrist, looped it around the gray slate, then pulled out a metal file he'd liberated from the Gaea building. Dangling the stone, he rapped one end sharply.

A clear bright tone echoed up and down the gulch.

One hooded figure straightened. This one's face was broad, his complexion ruddy beneath goggles. Michael Lee Dean, Blase's stage manager, glanced at his wrist and lifted a radio talkie. "It's a four forty-two A," rumbled from the matching talkie in Trev's coat pocket.

Trev marched downhill to join them. Blase didn't look up. Squatting on stony rubble, Trev scratched "A" onto the slab with a bit of white limestone. All efforts to fine-tune the slabs by cutting or chipping simply killed the clear tones. "This makes four, Blase," Trev said. "We'll find you an octave yet."

"This century or next?" The singer kept digging through a jumbled pile of slates.

Yeah, so Blase was in a foul mood. Nothing new. Falling gate receipts had made it easy to cancel his current tour and come hunting for Trev. Blase's performing career covered twenty-six terrannums, almost unheard of, and it wasn't enough. If he introduced something really unique, he might revitalize his act for another two-terrannum run. That's why he wanted Trev now, not later when . . . if . . . Trev felt ready.

Trev must find him that sparkle, that something *else*, or his future was already written. Two weeks of psych-conditioning, and he'd happily lie down for the surgeons.

But this ringing-stone gig had possibilities. As far back as the late twentieth, musicians had utilized ringing slabs for experimental recordings. But they'd always modified tape loops with electronic samplers, altering one rock's natural pitch to create entire chromatic scales.

Even Dean's eyes had come alive at Trev's proposal that Blase put together an entire band of compatibly attuned slabs, with all the tone colors of different crystalline types. Blase could create the first vidi, maybe even the first live show, using unmodified rocks. *If you just came up with the right themes,* Trev suggested. *Something planetary. Particularly with rocks from notorious, abandoned Goddard.*

That pushed Blase's greed button. It was just proving hard to find consonant pitches.

The singer seized, noosed, and tested another.

"You're welcome." Trev tried not to snarl it, for the Goddard colony's sake as much as his own. He and Blase had never talked a lot, anyway. He hop-stepped back down the gulch. If today's trip fell through, he'd suggest hiring colonial children to hurry the sorting process. They'd work for practically nothing. Say, a few spare parts. . . .

Gaea Terraforming Consortium had been fully within rights to cut its financial losses and abandon the colony. Thus far, the Lwuite colonists were doing well enough. All they really lacked were spare parts for every gel computer, orbital mirror, track-truck, differential filter, and seismic ear—not to mention the farming and regolith-processing machinery abandoned by Gaea Consortium.

They were still eating, but without reestablishing trade with manufacturing worlds they wouldn't be for long. All fifteen thousand of them.

On the other hand, with enough of those little spare parts, Goddard's colonists could process its ores into raw materials the habs always needed. So it wasn't just Trev's fate that rode on finding something valuable enough to interest Blase. Trev hoped to convince Blase to provide an unlicensed trade shuttle. Blase could afford it. Everyone knew he despised ExPress Shuttle Corporation. They'd smashed his amps and keyboards once too many times.

Trev shivered and turned fully away. Blase wasn't hero-stuff. Blase didn't even care that Trev got cold sweats thinking about cosmetic surgery. That the last thing Trev wanted was a singing career. Blase wore a gun: tranks, probably, on the outside chance his underaged son might make another break for freedom . . . or maybe Blase liked playing cowboy, out here on a genuine frontier. Trev's own gun hid deep in a browncloth pocket. His reason was less sinister: Most of the colonists went armed, partly against newly introduced predators and partly to keep potential nut cases checked. Blase didn't have to know that.

Toward the right side of the gulch, Trev spotted a promising specimen. The more ringers he found, the deeper a moral debt Blase would owe him. He hoped. After noosing it, he struck it at the sweet spot. Click.

He'd spent a lot of time at geology lately. The colony's young seismologists, techs recently promoted to full responsibility, had identified this zone as a "wave guide," one formation that channeled seismic vibrations with alarming facility. It gave them an ear trained on Goddard's interior, into a crustal zone that had begun to slip when terraformers reintroduced water. This gulch allegedly lay along a side fault hair-triggered to move "at any time." On the geologic scale, that meant the next few hundred years.

One tech had suggested showing Blase these ringing rocks. According to him, every stone had several natural frequencies. Commonly, they set up interference patterns that killed each other . . . and a stone went click when you hit it. But sometimes the frequencies reinforced, turning the stone into a resonating body with clear, brilliant overtones that projected an astonishing distance.

Rock music. The real thing.

A chill wind blew steadily down the gulch, and the sky still glimmered pale blue. The yellow-tan wall on Trev's right seemed to wink as he squatted.

Hm. He pushed back up to stand. Near ground level, a black, eye-shaped hollow reappeared.

Trev's back ached from leaning into the cold wind. Gingerly he crossed the gulch and peered into the wide black eye.

It "went." He ought not to go in alone without ropes and a headlamp, but he'd survive a few steps.

Crouching, he shuffled forward. It felt good in here. Out of the wind, his cheeks tingled. He tossed back his heavy hood, then pushed up his UV goggles and pocketed his gloves.

Only a few meters farther ahead, it opened high enough for Trev to stand up. The curving floor looked to have been polished by some primordial river before Goddard lost its original water. He followed it around one corner, then another, sliding fingers along the right-hand wall as he passed into total darkness. He was good at groping. He'd practiced plenty, hiding out from Blase and his staff back in the home dome on Venera.

Pushing off, he ran smack into a huge boulder. "Woof," he called. The cavern flung back his voice.

Good delay on the reverb. Experimentally, he yodeled a kid song he'd learned from colonists. It was a round; if he sang fast, he could harmonize coming and going.

Must be a fair-sized room back here. This was great. Maybe Blase could even release the first vidi recorded inside an acoustical cave.

Trev turned again and groped back toward the series of bends. After ten steps, he stopped. He hadn't come that far straight in.

Come on, come on. Don't get disoriented. Slow down and think things through.

Right. Turning once more, he hurried back toward the boulder.

Somewhere between steps, the floor vanished. Adrenaline closed off the cry in his throat as his left leg found bottom. It crumpled under his weight with a snap he felt all the way to his shoulders. The cave lit up green and rang like a dropped piano.

"Stin-king *soup,*" he swore, rocking his weight off the manifestly broken leg. So much for Blase's moral debt. He wriggled the talkie out of his coat pocket and thumbed to transmit. "Blase," he said. Little echoes died away. He gave it more gain. "Blase?"

Six kinds of stinking soup. The passage curved, and his FM-sideband talkie didn't have enough juice to blast out through stone. He flicked over to AM. Clear and crisp, someone back at the colony issued work orders on the powerful colony station. This cheap-soup talkie wasn't equipped with a microprocessor for sending AM bursts.

Soup, soup, soup. Trev levered himself into a sitting position, but he no longer knew just which direction he'd tumbled. Without visual references—and the cave was so still that his breathing seemed to echo—he'd only lose himself worse.

All right, then. Time to eat a little pride . . . if he could shout loud enough. Hoisting up on stiff arms, he gulped down a breath and yelled, "*Dad!*"

That made stars jump and spin around him. He lay his head on cold stone. And he'd thought his leg hurt before.

He inhaled again and shouted, this time toward the ceiling. Maybe his voice would bounce farther that way.

After a minute, Michael Lee Dean's bass stage-manager voice echoed down the upper tunnel. "Trevarre? You in there?"

"Yeah," he hollered. "Hey, I'm in here."

"Well, get yourself out, and move it. There's a storm blowing up."

Gods, of all the—"I can't. I busted my leg."

"Just a minute." Dean sounded disgusted.

Steps pounded back, and the ceiling gleamed with bouncing white spots and shadows. He knew that color. Dean the Ever-Prepared had cracked an emergency cold light. "Yeah," Trev called. "This way. Hurry." Now that he could see, he understood why he'd fallen. Three meters up, a clean break in the floor made a virtual straightedge.

A black-haired head appeared, then a red-and-black one, both with their hoods thrown back.

Trev owed them now, but good. "I'm sorry," he said, exasperated. "The kid is down for the count."

"Stay put," Blase said. Trev winced at the disdain in his voice.

A rope slithered down, followed by the wiry stage manager. He'd stripped off his coat. Under it, he wore colonial browncloth that hung loosely on him.

He probed Trev's left leg. "It's broke all right, Blase. Throw down the pack."

"Sorry," Trev repeated. "I've done stupid things in my life, but this one's a shiner." He stared up at his father. It was hard to read that face, changed as it was, with the muscles rearranged so many times nerves no longer signaled predictable expressions. But he thought he saw concern on it now.

Yeah. Cosmetic surgery was one thing. Unscheduled bone setting probably jostled Blase's stomach as badly as anyone else's.

"Didn't you even have a light along?" Dean dropped the pack and dug into it. "No, of course not. It must not hurt much yet."

"It hurts plenty."

"It's going to get worse." From emergency gear, Dean drew out an inflatable splint and a vial of pain pills. Trev swallowed one gratefully. It hadn't cut in yet when Dean braced against a fallen boulder and gave Trev's left ankle a twisting pull. The cave lit again in yellow, green, and red. "Ai!" Trev shouted.

But then it really did feel better . . . a little. "Where did you learn to do that?" he asked in gulps.

"I was hired for a lot of skills," Dean muttered, squeezing the splint. The inner capsule broke and filled it with quick-hardening foam. "Some of them, you don't want to know about. Up."

It took ten minutes of teamwork—Trev dangling and feeling ridiculous, while Dean scrambled and Blase tried to belay. Finally they winched him over the ledge. Then Dean seized up the cold light and curled his other hand around Trev's waist. "Come on, kid. Nobody's mad. Anybody could have an accident." They lurched forward like two hobbled horses. Blase caught up and gave Trev an arm from the other side.

It was weird, touching his father. Normally they kept about a room's width of space between them. Trev watched the floor to avoid tripping. There was more loose stone than he'd guessed, long and short gray slabs, some dusty from more recent falls, and here and there a nest of huge gray boulders.

At the last bend, both men stopped pulling. Trev glanced up. Outside the eye-shaped entrance, black sand sheeted past. "Oh Gods," he gulped. "Dad, we are *stuck* 'til that soup blows by."

"If we wrapped our faces," Blase said thoughtfully, "we might make the copter."

"You don't fly in this weather. I don't *think* I could fly at all," Trev added. His leg would have necessitated calling for help anyway.

"I meant to wait there," said Blase. "But we've got more air down here."

Trev grunted assent. "But unless Axis Plantation hears from us, they're going to assume we crashed in the storm." He leaned toward Dean. "Got a burst-talkie in that pack?"

"What do you think I am, a walking warehouse?" Dean straightened his goggles and swept on his coat. "I'll radio from the copter." He started out.

Trev leaned against the nearest wall and bit his tongue. He wanted to call Dean back. People died in these storms.

But if Dean reached the copter, he could surely burrow in. Trev wouldn't make it so far, not against sand in a headwind with a broken leg. "Once this blows over, Axis will bring out a dozer on a track-truck and dig for the copter. I . .. think I'd like to sit down," he finished weakly.

"Do that." Blase strode down the smooth passage, still wearing his coat.

Less than a minute later, Dean fell back through the opening. His ruddy cheeks glowed, and his breath came in gasps. "Can't. Too much. Look how deep already."

Black sand drifted knee-high into the cavern. If it buried the copter and Axis didn't hear from them, no one would ever think to look down here. Not even with metal detection. Especially not for a cave.

"Holy gods." Blase stroked his throat and switched on the octave doubler, then shouted, his voice coming high and low simultaneously. "If you hadn't blundered into the nearest black hole, we wouldn't be here. Now what?"

Trev let Dean help him to a long gray boulder. "There wasn't a weather alert on. This shouldn't be a really bad one. Most of these blow by in an hour or two. Once it quits, we'll dig out. It might be drifting deepest on this side of the gulch. The copter might even stay flyable."

"Might, might, might," Blase mocked.

Trev growled, "You want to spend all day yelling at each other?" So he hadn't yelled back. He would soon.

"Please." Dean sank onto the other end of Trev's boulder. "Spare us."

"All right," said Blase, "we'll shovel. Keep the way out clear."

Dean pulled his gloves back on.

Trev dug his own gloves out of his pockets, then crawled three-limbed after them back up the low passage. Using full arms and long, sweeping strokes, they scooped black sand into the cave. More, and more, and still more tumbled in, funneled down the gulch's sidewall. Finally, it closed off the entrance. They kept shoveling. Dean's cold light flickered. That meant an hour had passed. Trev's arms ached. His leg throbbed, and he choked on black dust.

Dean called a halt. "The whole gulch could be drifted in."

Trev crawl-dragged back to the gray boulder and flung his arms on it, making a pillow. Those funny stars were jumping again.

"This passage goes in," Dean observed. "It has to come out somewhere. One of us could go forward and get help."

"Yeah," Trev said quietly. "Just like in 'Gripp Manuel Meets the Beast from Zarathustra.' Forget it, Dean. Even if it does come out, the exit could be kilometers away."

Blase threw back his head and wailed, a long falling warble made doubly haunting as it fell simultaneously through two octaves. Then he, too, sat down. "Stay together," he said heavily.

Always the showman, Blase. Trev

pulled himself up to sit. This was not going according to program.

"Least we're out of the wind." Dean fished a water flask out of the pack and handed it to Trev. "Go easy on that." While Trev drank, Dean cracked another cold light against the boulder. "That's better. Brighter, anyway."

"Yeah." Trev wiped his mouth. "Nice cushy tomb."

"Don't start that." Blase drank, then passed the flask to Dean. One shoulder of Blase's crimson shirt glittered, a swirl of microscopic gold beads strung on warp threads.

Trev clicked his talkie's transmit switch on and off three times. No one on the other end reacted. Not that he'd expected it. "I'm sorry, Dad."

"Get that leg up and lie down."

Trev pulled the splinted leg onto his rock. "I said I was sorry."

"Obviously," Blase mumbled. He sat against another rock with his shoulders slumped. Blase had taken on a real adventure today. In twenty-six terrannums' travel between colonial domes and orbital habs, he'd picked up little experience with uncontrolled planetary phenomena.

There had to be a way out. If Trev thought about it long enough, it would come back out of his months' prospecting.

Meanwhile, Blase adjusted the cross-draw holster. It looked to be digging into his hip.

"Yo, Dad."

Blase flattened his hands and glared over one shoulder.

"It really is a good life here on Goddard."

"Sure."

"I mean it. There are risks—awful ones—but a guy's respected for himself, for the work he pitches in. It's survival at stake, not . . . gate receipts."

"Very funny. You got us into this survival mess. Get us out."

Blase wasn't listening. As usual. Trev brushed his dusty hands against each other. Abruptly he had to know something. "Dad, I. . . . What do you think of me, as myself? Besides ugly. Besides being a runaway and a coward."

Blase flicked his guitar-pick thumbnail along the fingers of his left hand. "Maybe not a coward. That leg's got to be hurting pretty bad."

"True. Could face-fixing be worse?"

Blase glanced over at Dean. From the back he looked like a long-limbed dog, shoveling sand to dig up a bone. "Trev, I thought I was offering you everything."

"Yeah," Trev muttered. "Everything you ever wanted."

Blase struck the stone with one fist. "It's pointless. We're buried." He touched the holster again. Yipes—that was no trank gun. Blase took those predators seriously. Not to mention the nut cases.

It took one to know one.

"Then maybe you should send Dean down the passage exploring. Better to know than to guess, huh?"

"You got some kind of trick up your sleeve? Is the rescue already arranged?"

Trev's temper slid loose. "Get real," he yelled. "Do you think I'd . . . ah, it's ridiculous. Talk to me when you're ready to listen."

Blase shrugged. "Shut it down. Start

thinking." And he sent Dean away with a cold light.

Once the bouncing white glimmer faded around a bend, Blase asked, "Don't you want a new face? All one color, with a halfway respectable nose and ears that match? Think about girls."

Trev lay down, stretching his legs on the boulder. "Do you know any women who love . . . no, who like spending time with you just because you're a worthy human?"

"They don't exist, except in songs."

"Where do you think those songs came from? I've met colonists homely as hogs. They love each other."

"Wishful thinking." Trev counted several beats' rest. Then Blase went on. "You're also rebelling."

"Yeah." Trev shut his mouth on the rejoinder that sprang to mind, then reopened it. "Didn't you?"

Blase cleared his throat, then evidently thought better. He didn't speak. Point scored. Maybe.

Fifteen minutes later, Dean shuffled back with the light. He'd tried the main tunnel first, then down over Trev's straightedge. They were, he announced, sealed in a long, high-ceiling tube, sand at one end and a fall of huge boulders at the other. He couldn't even find a blocked exit from the echo room.

Trapped.

Inside the splint, Trev's leg throbbed on. The second cold light flickered. Blase pushed up off the stone and paced. He ran a hand along a smooth limestone wall. Up at the ceiling, it changed color and texture, streaked here and there with brown oxide. "That looks like the rocks up top."

"Yeah," said Trev. "Must be slate. Overthrust fault, maybe. That's where these boulders fell from. They have really straight fracture planes."

Blase stared upward. "Just waiting for an earthquake, then they'll all fall."

"Eventually. One at a time." Trev pulled his coat tighter. So Goddard starved after all, and Blase's career was done. He remembered watching his father gyrate for thousands of screaming, leaping adolescents. His new-ancient composer's tricks, matching hormonal lyrics to gut-grabbing chord progressions, cut straight for the kids' emotional quick. The noise level at those concerts was seismic.

Wait a minute. "Just waiting for an earthquake," were they? What if . . .

"Dad," he said sharply, "shoot off your pistol. We're sitting on a . . . a 'wave guide,' a formation that carries sound for kilometers. It might carry a signal far enough for someone to trace it back here and find us."

"I'll try it." Blase pulled the gun out and fired three times into the gaping black passage. "Ancient far-Eastern distress signal," he said. "It's—"

A crash out of nowhere sent Trev straight into the air. His foam-encased leg toppled off the boulder. Grabbing for the edge, he regained his balance.

Dean thrust the light overhead like a stone-cold torch. A gray cloud rolled toward them. Trev clenched his eyes shut, ducked his head, and held a deep breath. When he'd counted a hundred, he slitted one eye open. The air had cleared enough to see rock. Dust crunched when he moved his molars. He wanted to rinse them with a gulp from the canteen, but wanted worse to save water.

"Well," said Dean, "I'd guess your crew picked that up."

Trev checked first one band and then the other. It was hard to hear over his hammering pulse. "Business as usual."

"Guess we'd better bring down another one?" Dean twisted his wide mouth toward Trev in a sneer.

Trev glanced up at the brown-stippled ceiling. Long shadowy cracks made it a giant's checkerboard.

"I have to save three cartridges." Blase reholstered the gun. "I won't watch you die of thirst, Trevarre. I can't do it."

By all the gods. Did Blase care about his well-being after all?

Nah. That was the quick way out of embarrassment.

Dean strode back to the sand pile and started digging again.

He could bring out his own gun. One falling boulder might go unnoticed, but two . . . three . . . would be so unnatural they'd have to snag someone's attention.

And there were louder phenomena than falling boulders. Suppose the fault was hair-triggered. Privately, each tech admitted he or she still knew nearly nothing about Goddard's reawakened subcrustal magma. There could be ten thousand years of stress on these crustal plates, just beginning to release.

At that point, he didn't have much to lose.

"Look," he called, "maybe we could get one of these big boulders to ring." Blase looked up gloomily from the spot he'd claimed on the floor. Dean stopped shoveling. "Prop it up high on one end, let the other end contact the floor. A pure note might cause a heck of a vibration on somebody's wave band."

Dean's mouth twisted again.

"The only problem," Trev continued, "is that we're sitting on a fault line. It's likely to set up, well, a slippage."

"Quake?" Dean's eyes shifted.

"Yeah," Trev admitted. "That could create a problem—"

"Or a solution," Blase finished simultaneously with Trev. "We're not *that* far underground, are we?" Blase added with a shake of crimson hair.

Trev almost laughed. Six meters of rock probably didn't seem like much to Blase. Trev had done enough prospecting to guess what it weighed.

"We could be ready for it. All the colonists get quake training. Look." He pointed toward a fall of huge boulders. "That's our shelter, if the fault goes. We could all squeeze in there."

"And wait for what?" Blase asked somberly.

"Yeah. Well. Rescue," Trev answered. "If we could make a stone ring loud enough to set off the fault, that ring'd show up at the Gaea building first. Someone'd see it on the graphs. And they do have the copter triangulated." *I hope*, he added silently. Geology was running shorthanded. But the ringing itself might alert some tech that all was not copacetic, and bring out help.

"Harmonic vibrations." Dean snorted.

"It's an idea. You got one better?"

The stage manager let black sand dribble between his dusty fingers. "Yeah. Dig."

Trev stared, appealing to his father.

"Sure it's crazy. That's why it'll maybe work. The LZalle family's not known for following anyone's conventions."

"Particularly not their parents'."

"Like father, like me."

Dean looked back, rolled his eyes at the slate ceiling, and went on digging.

Blase scuffed the floor with one foot. "Yeah. You are like me."

"Too much so to get along, maybe," Trev said softly. "Professionally, anyway. But I'm proud to be your son. Your genuine, born-this-way kid."

Blase's ebony face went blank. "Is that how you see me? One fake, trying to create another?"

Absolutely. "As one clever generation who created another. I just picked a direction you didn't expect. My risks are different from yours."

Blase's voice shrank to a whisper. "Yeah. Including the risk of failure down here. And if we don't get out, you take the responsibility. I'll give you the gun."

"No need." Trev drew his colonial pistol and made a show of checking the chamber.

"Huh," said Blase.

Trev slithered down off his boulder and helped hunt slabs. It proved hardest to find one long and narrow enough to use as a lever. Creating a fulcrum was easier. After that it became guesswork: Which boulders might ring?

"Come on, Dean. Give us a hand."

The stage manager helped Blase wedge a smallish one onto its end. "OK, sit. There." Trev balanced on the lever stone, then Blase stepped up beside him and steadied the boulder with both arms. Michael Lee Dean pulled back with his stone hammer and struck one end.

The first boulder answered with a thud, so they hunted down a second. Then a third.

The sound of the fourth impact filled the cavern like a gong, echoing off smooth walls to pierce Trev's ears and tunnel through his brain. Blase tucked his double-cleft chin and grimaced, but maintained his grip. Grudgingly Trev admired his old man's tenacity. The ringing faded.

At least nothing fell. "I don't suppose you carry earplugs in that pack?" Trev asked quietly.

"Uh," said the manager. "Yeah, I do."

Blase glowered, then accepted a vial containing two bits of compacted foam. "We might want our hearing again. Now *hit* harder."

Dean flexed his broad hands. "I'll try the old S.O.S."

Ears plugged, they raised the stone again. Dean struck mightily. When the volume died down to a less painful level, he struck it again; then a third time. "Now check the AM. I'll guarantee they heard *that*."

Trev was reaching down when the ground below him started shivering. "Hell's bells," he shouted, trying to stand up on one leg and grab the talkie at the same time. "The boulders!" He seized the stubby antenna and hopped madly.

Dean sprinted. Blase started to run, spun on one foot, then lunged back to drag Trev. As the shudders turned to heaves, Trev dropped the talkie. They pushed into the boulder pile. Trev wedged close to one of the largest. Crashing noises jolted his brain and muscles.

And then it was over. Almost quiet and utterly dark. Trev dug out his earplugs and swallowed his stomach back down to where it belonged.

"Everybody there?" That was Dean's basso.

"Yo," answered Trev. Blase said, " 'M all right."

A soft, scrambling noise from ahead, then: "Uuh. Don't stand up sudden."

"What happened?" Blase asked from Trev's left, down at floor level.

"Roof's lowered. I'll see if I can find the pack and the cold lights."

Trev wormed up to sit, then raised one arm. It met rock that sloped downward, away from his boulder toward Blase. "It didn't get you?" he asked quietly, concerned. He couldn't believe it. Blase had come back to help him.

"Nuh. I've got a few centimeters."

Trev rubbed his cramping thighs. "Can you sit?"

"I will when I'm ready." Blase coughed. "You know, it doesn't matter what you look like."

Trev blinked into true blackness. "Sure doesn't down here."

"Not anywhere. That was a good try, with those rocks. Thanks."

"Uh. Any time," he said lightly.

"No, I'm impressed. Those slabs will make a knockout show."

If. "You already give a knockout show," Trev admitted. Maybe he'd given his last. "But yeah. They might bring in tourists to Goddard," he added, picking up Blase's optimistic tone. "Tourists who could help out the colonists." *A tourist with money for that kind of travel just might be talked into trade running*.

Blase snorted. "I don't give soup for the colonists."

"I do." Come to think of it, he could've done them more good on-the-road, drumming up sympathy for them, than scratching for boron ore here. He wet his lips, then said, "If I went on your tour, Blase, you wouldn't have to admit who I was. Not at first. No one would guess. We could spring it later, after the rocks weren't novel any more. That could be good for another tour cycle."

"Yeah." Blase's voice rose in the dark. "Now you're thinking. *If* you want to join up."

Blase probably wouldn't offer this job again. And when it was over, Blase couldn't say he hadn't tried. How many people got this chance? "Compromise? Your show, my face?"

"Your loss."

"Blase!" Dean's voice called. "Give a shout. Where are you?"

"Here," Blase answered. "Testing, one two. Three four."

"Right." Dean's voice came close, almost breathless. "Trev, grab my ankle. Blase, come behind and push the kid. You're not going to believe this, but there's *daylight* up this way."

"Holy gods." Blase's usual oath sounded almost like a prayer, this time.

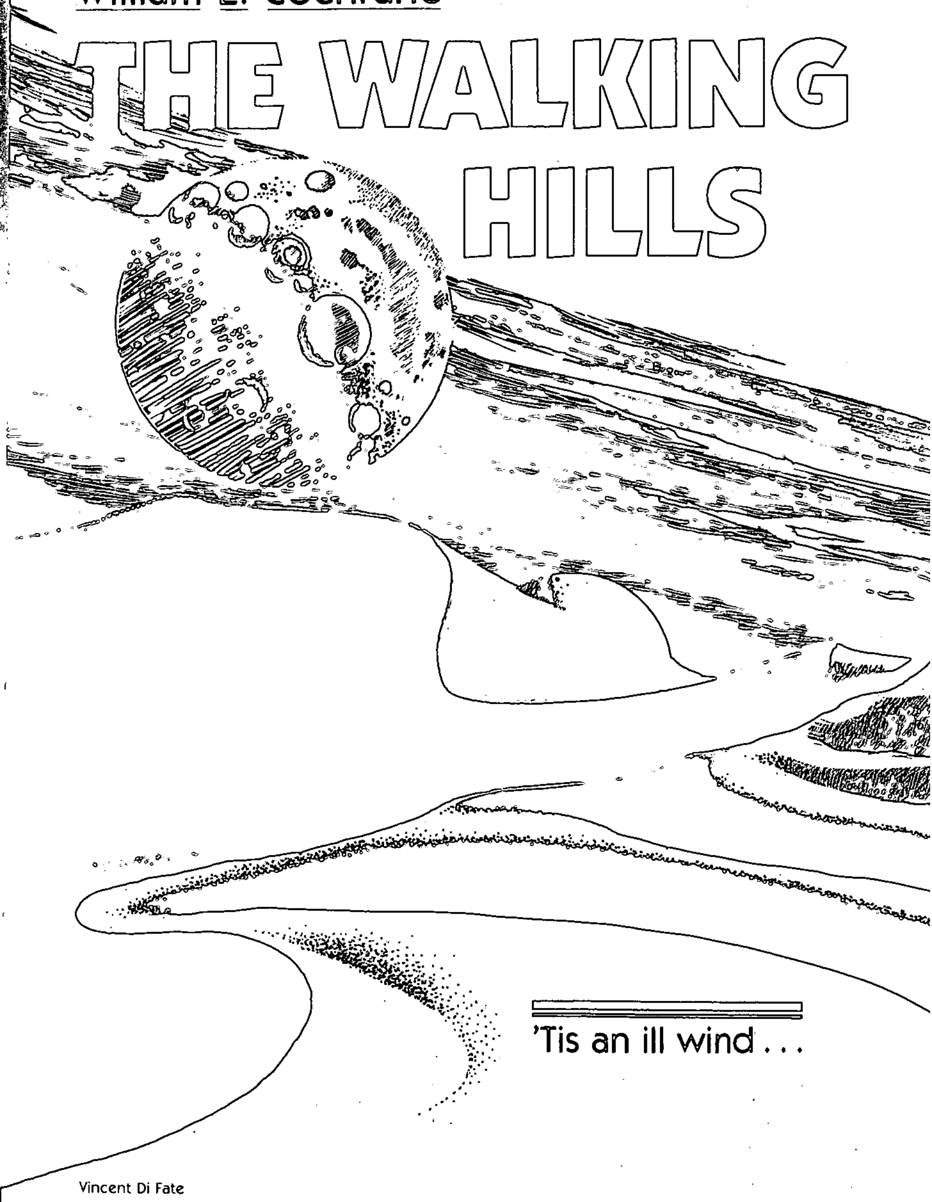
Trev groped for the manager's ankle. "Music to my ears," he muttered. "Blase, you've got a new second tenor."

"And rock ringer."

Trev kept crawling and let Blase have the last word. For once, it struck the right chord to stay quiet. ■

William E. Cochrane

THE WALKING HILLS



'Tis an ill wind . . .

Vincent Di Fate

One

Walter Jenkins woke up. First light; the night-sand was still blowing, drumming insistently against the dome roof. Walter's ears registered the fact, noting the noise was still above his head. The height of the blowing sand as it hit the dome was a clock to Walter; telling him the time and the temperature outside, as accurately as any of his instruments or thermometers, and at least as well as the brightening light level inside the plastic dome.

Walter rolled out of his sleep-sack and began to dress for outside. He had chores to do before the sun came up over the Starboard Mountains. Runnels and trails of sand grits ran out of the wrinkles of his sleep-sack, made little cones on the floor, or trailed flags of soft powder into the air below his bunk.

The sliding-sound level was lower on the dome now, as the blowing grits of the night-sand dropped with the sunrise. They blew along close to the dune surface later in the hot day air, but they were still head high—Walter's clock, timing the sunrise.

Walter turned to walk across the main room and discovered that his living dome had a tilt to it. He hadn't noticed while he was standing by the curving dome walls, but now, as he walked across the floor, the tilt was obvious. The dome was down by the bow, ten degrees.

Walter's dune was unstabilized sand, blown and coaxed into its shape by forces that were functions of wind speed and the number of grits per volume of dune. The upwind slope of the dune was an air-formed inclined plane, smoothed by the wind's need for geometric forming of countless grits into a sloping cone in order to push smoke-sand over the dune crest. The downwind curve, the curl, was formed more quickly, as the grits fell out of the wind, and dropped on the dune surface. Its angle was always steeper, approaching the grit's angle of repose, leaning like a frozen sea, with the shoulder of the dune driving it down the valley.

The angle was steeper. Walter's dome was tilted. The wind must have increased in the night. The dune was growing higher, maybe moving faster. . . . Although its top speed was slow indeed, faster did mean some danger.

Walter worked a series of valves on his panel. The valves allowed a stabilizing liquid to drain out of a seep network in the leading edge of his dome. This would change the sand characteristics in front of the dome and cause it to ride a little lower down on the slope of the dune where the wind, moving sand from under the dome at its bow and forcing it aft, would move the living dome along at the same speed as the dune system. Walter traveled with his sand dune, slowly but quite naturally.

The dome filled with the sound of hissing nitrogen as Walter bubbled more gas into the base support-cells to level his floor, to compensate for the new angle-on-the-dune. The gas burbled and then cut off as Walter shut the valves. The silence was deep. He sat, studying the deck-level to see if it would stabilize. Finally he was satisfied. He dialed the new dune angles into his auto-pilot-like console, leaned back, sighed, and shut down his panels. The dune system didn't change its shape very rapidly. This new setting would be good for a week, perhaps a month.

Walter picked up a water-pack and safety kit, then pulled his goggles and breathing mask over his head. He still had to get his chores done. Already, he was calmed down from the slight flurry of waking up to find his house tipping over; calmed down, and moving with the slow, economical ease of desert living. Emergency procedures on the desert were often like that. The desert had fast, sudden ways to kill a man, but its usual chosen speed was very slow. Sometimes taking weeks to set up a trap, then springing it over a period of days. The desert was slow; slow and sure. Walter had already begun to live that way. He'd left his spaceman reflexes back in civilization; back in Durban. He could move fast if he needed to, but he usually moved at the desert's speed—slow and sure.

He was at the door-port now, pulling the hood of his sand-jacket up over his head. He lifted the collection bag off its holding pegs and let himself through the door into the air lock chamber. He pulled his breathing mask up over his mouth and nose. The air outside was completely breathable—one Sigma, Earth standard, by the book—so he didn't need a life-support pack and the mask was merely a design of vanes and deflectors to control air flow around his nose and mouth. It produced an eddy flow that kept the heavier sand particles in the air blowing by his face, past his mouth, leaving a free area of clear air for him to breathe. Relatively clear, that is. Some fine smoke-sand and a few grits got through every once in a while. But Walter's shaggy mustache and beard filtered out most of that. His breathing was easy most times when the grits weren't blowing head high. He had a safety air-pack for that, to blow an air jet for clear breathing, but he rarely used it. The face mask's vanes worked well in convection currents and the average daytime wind was forty kilometers per hour in clear air; more than enough to keep the grits away from his face mask.

Walter's first chore, the reason he'd come out before breakfast, was the water collectors.

This first chore took Walter out into the sand away from the shelter. The blowing smoke-sand was down now to knee level and he waded through it much like water, but only because he couldn't see his feet. The sand streams gave him no resistance. At intervals he knelt and busied himself with something beneath this streaming layer of grit. At such times he would put his head and shoulders down into the smoke-sand, close to the ground. Then he would get up and go on to the next spot. He was tapping a series of water stills; collecting the night-condensed water from covered cone-shaped stills emplaced in the sand. At the end of his hydraulic trap line Walter had a little over two liters of water in his pack bag.

He twisted the nozzle on his air tank, briefly, to blow the grits clear of his beard and mustache, then went back towards his dome. He stopped at the weather buoy and took the morning readings. The weather buoy was mounted on a skirt of the dome, sort of a trailing after-deck that followed the dome through the drift-sand.

Pop ask! A two-inch static and spark

discharged off his hand, causing him to yell and jerk reflexively. A green ghost-dance of electron discharge played around the weather buoy as the air and smoke-sand ionized in a St. Elmo's fire display.

The morning air was full of static. The grits were moving about on the surface of the dune more than usual. No, maybe not. He'd check his map. The static activity might just be normal for this location in the valley. The dune he was riding ought to be about in the middle of the valley around this month. Down in the center of the valley where the wind was faster the static was to be expected. Walter had not been paying much attention to his location lately. The dune probably had just moved into the part of its season where things got sparky for a couple of weeks. He filed a mental note to watch his grounding habits from now on.

Walter read the meters on the weather buoy, but he took the trouble to discharge another fat static spark before touching anything on the buoy. The blowing grits charged the surface of his sand-suit quickly, to rather respectable voltages. The sparks were bright in the daylight, and loud, even over the wind-sand noise.

Next he set up the sighting ring and began lining up the aiming points on the Starboard Mountains. He was using a simple azimuth ring-and-post locater.

He took two readings, marked the azimuths on a record pad, swung the indicators around and took a third bearing on a rock spur of the Port Mountains. He did this quickly, competently: a morning chore, performed routinely. After breakfast he would plot the angles on his chart and date the position triangle. The chart was the only physical calendar he kept, preferring to let the days roll by unmarked except for this one navigating habit.

A whistle-scream keened out of the sky, stuttered in a series of interrupted whistles and went warbling away over the Port Mountains.

Walter looked up at the first sound and caught the sun-flash reflected from a plastic canopy. He lifted his palm against the rising sun until he found the flying shape of the supply flitter as it circled over his dome. Then he turned his upraised arm into a wide wave, acknowledging the friendly rotor blips that the pilot had sent him.

It was later in the month than Walter had thought. The supply flitter, out of Durban, was crossing his valley on its way out to Mitty Conner's claim. The pilot would make Mitty's supply drop, load Mitty's processed ore blocks, stay overnight, then be back over Walter's site in two days. The flight of the supply flitter was easily predictable. Walter's dome and Mitty's mountain camp, seventy kilometers to the west, were the only two places humans lived in the outer desert. The supply flitter didn't have anyone else to supply.

Walter had left *people* to come out here on the desert; left people and crowded spaces. He had shipped as a navigator-astrogator on Outstar transports for fifteen years, until one day his ship's cabin had gotten too small and the vast port town had too many people per cube-meter. Then he'd come farther Outstar, to a colony planet—Sahara—where there weren't too many people and open land stretched out in high, lonely deserts and rocky canyons. He'd come out as far as this rill valley and had slowed down to match the desert.

However, while Walter had left people and crowded worlds behind, neither he nor the colonists around the port city of Durban were fanatic enough to throw away the comfort and science of civilization. He was as alone on his desert sand dune as he wanted to be, but he lived in a flexible plastic dome, inflated and designed to float on the deep sand. His contact with Durban was by FM transceiver and his supplies were flown in by a hover-jet. He was sophisticated in his solitude.

He watched the supply flitter out of sight, then spread his arms out to stretch the kinks from his back, and took his morning look-around. The sun was clear of the mountains now and beginning to flood its heat into the valley. The blowing smoke-sand was down to boot level and would stay that way until after sundown. The shape of the valley was clear too, long and wide. Long enough so that both ends were nearly invisible, except for the perspective of the two mountain ranges on each side, and a smoky blue color on the horizon that marked the hills that closed the valley. Walter was standing on the crest of a sand dune. To his right, spread out across the valley toward the Starboard Mountains, were two more dunes. They were spaced well apart and echeloned ahead of him down the valley, so that the farthest dune was about two kilometers ahead of him. The valley at this point was a wide, flatish bowl in cross section, sloping up to the sudden upthrust of the mountains on each side. The sand filled it on the flat and made a band of desert four kilometers wide across the valley. The dune system was stretched across the upwind edge of this band of sand. Three waves of sand, swept up in high swells by the wind, cresting with steep slopes on their downwind sides and breaking in a gritty surf as the wind tore spumes and swirls of smoke-sand off their tops. Walter watched the sand blow. His eye followed the grits as they swirled in the wind. They spun a sandy fog along the upwind curve of the dune top, then, dropping below the crest of the dune, in the wind shadow, the shimmering grits fell out of the air and disappeared against the slope of the dune. The sand blew off the back of the dune and fell on the front face. This was the way in which Walter's dunes moved down the valley. He'd never stopped marveling at this simple mechanism of wind and sand. He'd seen it a thousand times. The wind blew constantly day and night; the grits were feathering off the dunes whenever he looked.

With a snap, he closed down the azimuth table and started back to the dome. Then he stopped, head up, as a flashing point of light caught his eye on the shoulder of the mountain, kilometers down the valley. A silicon grit twinkling in the sun? No, it was too bright, and too far away. There! It repeated . . .

A truck windscreen reflecting the sun? He remembered the sun-flash of the flitter's canopy.

Could he get a bearing? Nope. Reflections were sun-angle things. By the time he got back to the azimuth ring the sun would be higher. . . . He probably couldn't see the flash from any place else but right here.

Walter eyeballed the peaks above the flash and looked for other landmarks. Anything outstanding that he could see from this distance would probably show on his charts.

The glint of sunlight could be the reflecting surface of a tractor truck. The truck, if it was a truck, would eventually come out to him. If he was going to have visitors, they would get here in due time. His shelter dome was the only human habitat for seventy kilometers in any direction.

He let himself back into his shelter lock, stepped on the insulated plate and touched the ground buss. A sharp snap told him he'd discharged his sand-suit. Then he stepped carefully away from the ring of sand grits that had been thrown off his suit and now lay on the floor. The book called for three repetitions of this cleaning drill, but Walter no longer cared about a little grit in his home. Despite stringent precautions the grits got in anyway. Sometime during his first year he'd stopped bothering about them.

He let himself into the dome and decanted the two liters of water into his main tanks. Then he opened the lids of the kitchen equipment to start breakfast. He ate slowly, finished his coffee, then clipped the plates and his frying pan to his homemade dishwasher rack, and pushed them out through a sphincter opening into the blowing grit-filled air.

He began a slow prowl about the dome. He folded his bed, rolling the sleep-sack and mattress to keep down the grits; straightened a shelf; put away four or five nodules that he'd classified two days ago. He seemed to have a purpose to his movements but they were just fussiness. In part, he recognized that he was worrying something in his mind but he didn't try to force it out. The worry would come with the wind; and the wind was always blowing.

He turned on the sonar and set it to sweep the sector where he'd seen the flash. The power would have to build up to reach that range.

While he was waiting, he plotted the location azimuths on his charts, a routine task but still fussiness.

The sonar *ping* sounded.

Walter dated the triangle on the chart and firmly connected it to yesterday's position with a strong line. The sand dune had moved farther since yesterday's progress, and Walter's dome had moved with it.

The sonar *ping-pinged* again.

Walter went over to the set and punched on the screen. His dome didn't have radar. A rotating antenna would have ground its bearing into polished ruin in an hour; the wind would have blown even an open mesh bowl into twisted wreckage once it became clogged with sand and began to resist the steady wind thrust. Radar signals would be useless in the blowing sand, in any case. Sonar was better for long-range eyes whenever Walter needed them.

The picture built up on the screen; a vertical blur that was the Starboard Mountains and a low horizontal shape stretching out into the valley. The horizontal line was a hard return and ended before the left hand sweep of the sonar trace. Walter checked the range timer and read the scale reticle. He pulled the graph sheet out of its drawer and carried it back to the chart. The centerline of the sonar sweep; a finger along the graph to read true length at the range; two arcs with the compass, and Walter had located what the sonar "saw." He checked the mountain's contour lines for those landmarks he had noted. This sonar return was almost exactly where he'd seen the sun-flash. But this was too big to be a truck. . . . He looked back at the screen. The range had not changed, neither had the direction of the object. It wasn't moving. Not a truck, but it *reflected sunlight*. What . . . ?

The object could lie anywhere between his arcs, of course, but since one end of it was anchored well into the return from the mountain, Walter made a guess and marked the line at right angles to the mountains stretching halfway out into the valley. Something long and—he looked at his finger on the graph—twenty-five meters high. That figure sounded too big, more likely three or five meters. He'd be interested in seeing what it was.

The compass points spread between today's position triangle and yesterday's, then walked along the chart. It gave him five days until the leading dune would be close to whatever it was. Five days, Walter didn't bother to scale off the distance. The dune moved at a predictable speed, five days was good enough for time and distance both. And the time slaked his curiosity, a bit. Not a matter of waiting, just a time consistent with his way of living on the dunes. In five days he'd see what was to be seen. Take a trip across to the lead dune and rubberneck a bit.

He rolled up the chart and busied himself. He had other things to do.

Still, the worry, or maybe the curiosity, kept at him. So when the light level in the dome indicated noon, Walter decided to do a little gossiping. He had a radio and at certain times—sunset, just before sand-rise, and at noon, with the sun overhead—he could talk to a couple of people. Three to be exact; Edgar Bain, the supply factor at the space port, Police Sergeant Ed Edwards at Durban, and Mitty Conners. Out of a colony population of six thousand or so on Sahara, those three were the only ones Walter talked to willingly. He'd given up people when he found this rill valley and moved out here. Given them up as much as he could anyway, he hadn't rejected civilization to the point of abandoning the mechanics and support of a space-supplied colony. There were a lot of people behind Walter's life support dome and his air-delivered supply drops. He knew that, but he just didn't like to talk to them. He maintained his isolation by just talking to three.

That sonar trace, now, Walter thought. How come it had gotten so close without . . .

He dialed the frequency of the police post at Durban, switched to the high-gain antenna, and cut in two more power cells. Talking to Durban took a lot of reach. He cut on the transmitter and switched in the tape repeater to squirt out his call signal. He left the call in while he drew a cup of water into the coffee heater. The coffee heater flashed the water and Walter spooned in a liquid coffee condensate he stocked. He didn't mind grits in his food, but he'd never been able to drink anything made out of coffee-flavored sand.

"Hello, Walter. Turn off your

squawker, man." The Durban operator's voice squawked the speakers, "PCX554 to HW330, come in. We are receiving you. Hello, Walter Jenkins. What can we do for you?

Walter said, "Hello yourself. Is Sergeant Edwards in the post?"

Durban said, "He is that. I'll buzz him up. You got trouble, Mr. Jenkins?"

Walter said, "No. Nothing serious. Just need some answers, thanks. Take your eager hand off the panic button."

The voice from Durban said, "*Hack. Hack. Ack.*" A voice Walter recognized as Sergeant Ed Edward's laugh. The policeman always came on jolly and laughable on the radio.

Edwards said, "We're always eager, Jenkins. We haven't had a good emergency since the fire in the bar. And that was out before we got there. *Hack Hack Ack*. Never knew we had so many amateur firemen—or professional drunks. What can I do for you?"

Walter said, "I got a strange sonar blip in my rill. What do you know about that?"

Sergeand Edwards said, "The whole colony is strange to you, Jenkins. The only guy that ever sees you is the pilot on your supply drop. You mean the work crew for K.M. & B. has got their pipe crew out that far already? They're really sweating."

Walter said, "Pipe crew?" He ignored all the rest of Edwards's chatter. "In my rill? Do they know about the wind, heh? There'll be wind down where they are; more than I've got here. The valley gets narrow there."

Edwards said, "I'll take your word for it, Walter. I haven't any charts handy. Wind? Did they know? Yep, their surveyors knew about it, I remember. They must-a known, Walter. They laid the line right across your valley, didn't they? They'd tell the work crews. Hey, don't worry. Your winds are troublesome, but they aren't dangerous. A man can walk around in them OK, as I remember. You've got no worry. Except the people, maybe."

Walter said, "Yeah, people. How come? I'm filed on this rill. My position reports are up to date. What's the law, Ed? Do I own that hunk of valley, or don't I?"

Seargeant Edwards said, "Don't get hot, Walter. Of course you do. You got one of the screwiest homesteads on this planet—a moving claim seventy kilometers long. I had enough trouble when you filed it, so I remember. *Hack Hack Ack*. They aren't bucking your claim, Walter, they found a gas well over at Mitty Conners's claim. They bought a right-of-way under their 'development of gross planetary product clauses.' The paper's in your mail, whenever it catches up to you. The check's in your bank account. You aren't as rich as Mitty, but you can buy me a drink if you ever come out of the sand."

Walter said, "You give them a warning for me, Ed. They got three, maybe four days to clear out of there."

Sergeant Edwards said, "Now, Walter." The laughter went out of his voice. "Don't start any trouble. The deal's all legal. You'd have to buck me, if you start trouble."

Walter said, "I ain't bucking you. You just tell them. I don't have their frequency. Three days and my dune'll be close enough so I can go down there myself. Meantime, you tell them. It'll be dangerous staying any longer.'' Walter cut the transmission, receiver and all.

He threw on his grit-jacket and started assembling water bottles and his emergency sand-kit. The radio voices, the sonar trace, *people* crowding into his dome . . . quite suddenly Walter had to get out; out on the dune. He needed the blowing grits to chase the people away, out of his mind. He jerked his air mask and goggles into position and went out. This time he turned left around the curve of the dome and opened up the storage hatch with the big *One* painted on it. There was no Number Two hatch, or Number Three.

Storage Hatch One held the sand sailer. The only good thing he'd ever let a salesman sell him. He stowed the ration packs, kit and water bottles in the cubbies on the hull, and towed the sailer upwind. It slid easily on three wide, stubby skis, up over the dune crest. He pulled on the bow wire, lifted up the mast, and set the boom in place, then tugged the sail up the mast. The first sail of nylon slats hadn't looked too practical and Walter wrote the company, telling them about his wind and sand-grit conditions, and ordering a spare. He'd gotten back two of these sails at a price that made him think most of the cost was yanked out of the salesman's commission. The sail was made up of narrow strips of wire mesh that opened and closed like a blind. They were transparent to the sand but caught enough wind to power the sailer very well. The sail was small and narrow, but it had never torn or given him a day of trouble. He still had the spare in its box.

Walter gave the sailer a running push, turning it slightly crosswind, then hopped on as it began to slide down the back curve of the dune. He tightened in the boom and turned away from the wind a little more. The sail took hold and began to drive the little vehicle across the dune. One ski, the left one, was high on the dune and shoved into it by the pressure of the sail and the mast. It kept him from making leeway and he reached out across the dunes, easing the sail out a little and angling down the curve of sand. He was heading for the second dune in the echelon of his system, which was downwind from his dune, but he wanted to end up on the trailing edge, on the flat-sand behind the dune. He only had to let the sailer fall off a little from a direct crosswind course and he would make it quickly and easily.

The sailer curved down off Walter's dune, rose a little as it crossed the shoulder of the other dune and was out on the flat-sand again. Walter turned it upwind now, to slow it and head for the thin-sand at the end of the dune. When the rock plain showed up, he swung head-to-wind and let the sail down. The sailer slid to a stop.

Walter took out a piton, found a crack in the grey-red rock about two meters in front of the sailer, hammered it in, and set his anchor line. Then he checked the amount of sand under his sailer to estimate his time and began walking slowly away from the sailer along the edge-of-sand.

Walter was working now, hunting for nodules; the money crop of his sand dunes.

The wind blew the sand up the surface of the dune, over its crest and out into the air to fall on the downwind curl of the dune. This constant changing shift of sand worked to move the dune system down the valley at a constant, irresistible speed. Another result was a filtering from top to bottom of heavier metal particles and dust. Somewhere, deep in the dune's interior, a balance of pressure and temperature brought the metals together in a natural chemistry and rolled then into small round nuggets—nodules. The nodules, now heavier than the sand, sank slowly to the rock surface of the valley and were left behind as the dune moved. It was not a quick process. The dunes' movement was measured in centimeters, but they managed to travel the length of the valley during the year. However, the nodule's forming was a thing of decades; a process so slow as to make the dune's walking seem an instant flicker of reflex. But nodules did show up as the dune moved away and uncovered them. They were almost pure metal and sold high. Walter sought them diligently.

Walter quartered the dune edge doggedly, finding nodules and relaxing in the no-thought solitude of his harvesting. He had to move the sailer twice to keep it on the sand as the dune system walked away from him. On the last move he glanced at the sun, estimated the time of his upwind sail back to the dome, and quit for the day.

That pipe crew . . . The worry came flooding back into his mind. *They were in the Slot. The winds were high there. And when the sand dunes came through the air would be filled with unbreathable concentrations of grits. Sergeant Edwards had to get them to move out. The Slot was dangerous. The danger would come with the wind, and the wind was always blowing!*

Walter pulled his piton and swung the stern around, heading for home. He raised the sail and swung off, heading downwind as he reached to climb the dune shoulder, then working back close to the wind. He wasn't very far downwind of his dome, so the sail back was easy, just a few tacks. He was back at the dome well before sunset. The surface sand hadn't begun to rise yet.

Two

Walter opened his Storage Bin One and packed the sailer away, then unloaded the rations and water and stored them inside the door. He snapped a new set of lenses in his goggles and went to take his sunset position readings. They were his last chore for the day, and when he worked his way through the door-lock he slumped in his chair and gave himself over to fatigue and coffee. His feet pulsed with the tired ache of walking on the valley's unyielding rock. The sand dunes, through the years, had scoured the bedrock smooth and level, but it did not give under his feet like the sand. Nodule hunting left his arches and leg muscles tight and quivering in their tiredness.

The singing whisper of the sand began to rise up along the wall of the dome. The sun was setting. The dome's light panels had faded on, as the outside light dimmed. The rising, falling, hum of the sand against the dome was Walter's clock. Now, as he was tired, the murmur was dropping him close to sleep.

During his first year on the sand the

grits had sounded like human voices. Then, for a while, he'd heard music. But this was all an illusion of loneliness and he recognized the fact. Now, the rising-sand was just a comforting noise that told him his dome was still being carried along by the shifting dune. The under contours and surface shape of Walter's dome were curved to aid the wind. Sand sucked out from under it was guided to the forward edge to build up the body of the dune so that the dome slid slowly down the curl of the dune as the dune reformed under it, and the curl built itself up behind. The dome, Walter's dome, moved at the same speed as the dune, traveled with it. The instruments and his locater azimuth ring were on a skirt of the dome's base and moved along aft of the habitat.

Walter roused himself from the drowse the sand had lulled him into and busied himself with dinner. Then he plotted his position readings for the end of the day. He didn't need two position reports a day, the dune didn't move that far, or that fast, but the evening position check rounded off the day, marked the passing of time.

Finally Walter shed his sand boots and rolled into his bunk. He dimmed out the lights and let the sound of the sand rise around him in the darkness. The grits were singing high on the dome now, overhead and all around him in a warm murmur that carried sleep easily and effortlessly in its tonings.

The next two days went by with the same level calmness. On the second day, Walter took a supply drop from the factor's flitter. The flitter stayed high, keeping its jets clear of the blowing grits, and dropped Walter's bundles on ribbon chutes fitted with explosive cutters to shred them into flapping banners on contact with the sand. Walter collected his bundles, and most of the flying streamers, then waved the flitter away. He didn't have anything to send out this trip.

The flitter circled once more and flew down the valley.

Why was it headed that way? Oh, yes. The pipe crew, of course. Walter had almost forgotten about them. *Hmmm. Maybe it was time to pay them a visit. What had he said? Five days?*

Walter lugged the drop bundles into the dome and left them on the deck. He wanted to check the chart.

A few moments with the dividers, and an overlay showing the echelon of the three dunes, let him verify that the sand was close enough to where the pipe crew was working to let him run his sand-sailer down to them. He'd leave in the morning.

A small detail on the chart caught his eye. He checked with his dividers and discovered that the length of run for the last two days was longer each day. His dune was speeding up.

Of course. He ran his finger along the shoulder of the Port Mountains. This was the spot in the valley where the two mountain ranges necked down, narrowing the valley floor—The Slot. The wind blowing through this choke increased in velocity, carried almost four times as much sand with it. The dune system would move through The Slot under the drive of near gale force winds—incredible violence for Walter's usual steady-wind, calm-paced way of life.

He hoped Sergeant Edwards had been

able to get his warning through to the pipe crew. They should be pulling out of their work site any day now. A delay could be dangerous. Well, he'd go down tomorrow and see. There was still time for a trip down and back before the wind got too many grits in it. Wind would be wild down in The Slot, but the sailer could take him to within a kilometer of the flat fore-sand of the dune system—maybe half a kilometer. It'd be a stiff walk in the wind, but a man could do it. The pipe crew had been working in that wind for some days now, so Walter guessed he could put up with a little hike.

As he did with all his orderly decisions, Walter slid this one into the back of his mind and unbuckled the straps of his supply bundles to begin the time-spending, mind filling, treasure hunt of opening and storing away his supply drop.

Early next morning—his sleep had been fitful and he'd been up before first light—he'd switched on the dome's autopilot so it would control his dome's traveling as the dune system went through The Slot. Then he'd come outside to load the sailer and start for the pipe crew work site. The stowage hatches held double the usual food and water ration, and this time he took the spare sail. In the high-wind country of The Slot it would be insurance. He made his routine morning location sights and tucked the note pad in the sailer's stowage box. The data could be logged later. There was a strange sense of urgency pulling at him to get the trip started. Walter moved through his morning routine with, for him, a growing urgency. The pipe crew's danger was growing in his mind.

At last he shoved the sand sailer into motion, then tightened the sail to bring it up to speed as he steered along the crest of his dune until it began to curve downward into the trough between the two dunes. There he let the sailer fall off downwind, let out the sail, and rode over and down the face of the dune. Picking up speed as he set his course on a long downwind reach toward the foot of the third dune in the echelon.

The trip stretched out, but as he sped closer to the center of the second dune he began to feel the wind pick up speed. It drove him faster and faster.

In two hours' time he was clear of the wind shadow of the second dune, out on the sloping tongue of flat sand that led the dune system. Now his sail was getting the stronger wind of The Slot and skimming at high speed, the sailer's upwind ski sometimes balancing clear of the sand. Walter worked his sail controls, lowering the thin sail into its reefing slot in the boom to stabilize the skis. The smaller sail area kept him flat on the sand, but the wind strength was increasing and the sailer moved even faster.

For minutes now, he had been peering under the sail, looking ahead. Ground level visibility wasn't good down here on the forefoot of the dune system; the smoke-sand was always in motion, but he was getting close enough to the location of his sonar return. . . . He should be able to see something soon.

He caught a flash of orange light—a rotating marker beacon. The work camp was close and almost directly downwind. He'd nearly overrun it on his cross-wind course. He put the wheel over and let his sail out to run down on the beacon light. His speed slacked, the noise and the violence of the grits faded away as the sailer moving only at the speed of the wind, slipped along the flat sand. Now, Walter was watching ahead for the color change that would indicate the valley rock and end-of-sand. The dune system should run out well before. . . .

A dark, heavy shape loomed up ahead of him. The pipe crew camp! He should have run out of sand! He'd be on the rock! Walter swung the wheel up; snapped all the sail lines free and whirled the sand sailer into the wind, balancing it to a halt as the sail slatted wildly. He took his bow line overboard and pounded in the anchor piton. It went deep into the sand before it locked into the bedrock. The sand layer was half a meter thick.

He handed his way back along the rope to the sailer, bracing against the wind, fought the sail down, and switched on the locater lights and radio beacon. He unpacked a half-kilometer coil of light life-line, packed his water and E-kit, and was ready to leave. He took two safety loops around the sail winch to tie off his life-line—the bitter end was permanently belayed in the center deck-eye—and started walking toward the dim shapes ahead. The wind pushed him along down here, he could lean back against it, walking heel-and-toe as if going downhill.

In point of fact, he was going uphill, up the rise of a low sub-dune. It wasn't more than a meter in height, but it was tall enough to get his head and shoulders up out of the smoke-sand. He stopped, lurched to a halt with the wind kicking him in the back.

A big desert truck loomed out of the blowing sand. Its windscreen flashed a red glint of reflected sunlight at Walter. The blowing sand dulled the sun to a red glare, but the flash was enough to tell Walter that this was what he'd seen, flashing bright, three days ago.

And beyond the truck, he could see the pipeline. . . .

It wasn't a pipe laying along the rock—the day-heat and night-cold would boil and cool the moving gas, so the engineer had lifted it off the rocks on bolsters at intervals. It wasn't stringing through the air between bolsters—the wind would vibrate destructive harmonics in the span. The engineer had cradled the pipe in a running channel between each bolster.

The engineer . . . The pipe crew, had built a wall across half of the valley! A two-and-a-half meter high, concrete and pipe wall blocking the wind and sand dune system. Blocking the sand dunes!

Walter began to move in a stumbling run. Since he'd been on the dunes Walter had learned one basic fact above all. The grits could be diverted to flow around, allowed to flow through, drift in piles, blow up with the night wind, blow, blow, blow; *but they could never be blocked*. The energy of impact of one grit was tiny; the weight of one grit was insignificant; mass times velocity squared was a small number—singly. But . . . the number of grits per minute was incalculable. The number by the day or week, nearly infinite; in time, irresistible. Even the planetary bedrock was eroded away by the energy of the grits.

And the pipe crew had built a wall—across the stream of wind and grits.

They had already had trouble. A living trailer had been tipped over sideways. Set in place with the wind as the only force against its sides, the design load on its foundations had tripled when the grits had begun to arrive. The downwind foundation crumbled and a small drift had pressured the trailer up and over. The final collapse had just happened—doors were pried open, men began to climb out—as Walter jogged up.

Walter yelled, "Where's yer engineer?" He caught the first man out and yelled in his ear. "I gotta see him quick."

The man shouted back, "I'm the engineer." The grits were noisy in the turbulent air stream. The increase in sound was a warning of the damage they could do; a warning to Walter's ears.

The engineer said, "I'm Rogers. Who the hell are you?"

"Walter Jenkins. I live out here. Anybody hurt in there?"

"I don't know. Jenkins? Hey, you're the guy who had the cops tell us to get out."

Walter said, "You don't know much, do you?" Walter had seen enough uninjured men come out of the trailer to guess that the trailer had gone over slowly, not hurting anyone. "That's one hell of a way to build a pipeline. Didn't anybody tell you about my sand dunes? Get your men out of here! Quick! And everything that will roll. You're in deep trouble."

The engineer said, "Now wait a—we aren't anywhere near your dunes." Rogers was face to face with Walter, his expression changed from stunned shock to anger as one and one added to four in his mind, the thoughts plain on his face. "You! You wrecked my trailer. You gonna blow up the pipe? Wrecker!" He started his swing wide, although he was standing too close to give the punch any weight, he did know something about fighting and kept coming in.

Walter tucked his head down behind a shoulder to protect his breathing gear and grabbed hold to keep in close. Walter liked his slugging at body contact. When the other guy was trying to get away he got hurt.

The wind slapped him on one shoulder. Walter pivoted, pulled the struggling engineer around, and snapped his head up with an elbow. *Let the wind and grits blow in his face, take the steam out of him.* Walter pumped a short jab into the man's gut, heard his open-mouthed yell, then a sputter and choke. The wind had obligingly filled his mouth with grits.

Both of them were getting in body blows, but the plastic of their grit jackets were soaking up most of the hurt. Walter didn't want to trip him down into the ground sand; he could get a lung full and strangle down there. And the engineer wasn't good enough to trip Walter. They were wrestling in the blowing grits, like two bears, stirring up their own sand whirls downwind as they kicked through the ground-sand.

An amplified voice roared at them. "All right! Break! Break! You been at it long enough. Nobody's gonna win, so break it. Pull 'em off each other, you guys!"

Walter got in a lucky punch and the engineer went flat. Then hands grabbed him, jerked him away from the fallen man. Rogers started screaming in pain.

Walter yelled, "Pick him up. The sand'll choke him."

Everybody was talking at once:

"Get him up!"

"Let's get out of this. The sand's choking me."

"Drag him in the mess trailer!"

Their words were muffled and came at Walter in fragments, but the hands on his arms and shoulders were firm and hard. He was hustled across the sand, the job finally falling to two men when the crowd discovered that everybody couldn't push him at the same time. With the manhandlers down to two Walter was able to get a look at the men holding him. To his amazement, the first thing he saw was that they had handkerchiefs across their faces. He looked around the rest of the crew. Some were uncovered and one was wearing a filter mask—a paint filter, in the grits. The mask would be clogged and useless in minutes. It might even kill its wearer.

Walter yelled, "Get out of the sand! You guys don't have any masks."

"Shut up!" The two holding him jerked his arms, shoving him toward a trailer.

Walter saw another tracked truck, parked by the trailer, and twisted his head to keep his eyes focused on the truck through the swirling grits. He thought he'd seen . . . yeah, the green crosses of the emergency kit-box on the truck's cab.

He gave a twist, tore one arm free and bucked the second man over into the sand. He reached out, grabbed, and pulled the first guy over to tangle his buddy. Walter jumped clear and started for the truck. He was two steps up the treads—had the kit-box open—when they caught him.

He yelled. "In the door, you apes!" He clung to the kit box, as they pulled him back. "Breathing masks! Paper packs!"

"Don't let him wreck the truck."

"What a nut! Where'd he come from?"

"Hold it, Jerry. What's he talking about?"

"Breathing masks?"

"Mouse, get up there and see what's in that kit." Somebody, one of the truckers, was getting some sense. "I could use something to breathe with. This handkerchief's zilch."

"Hey, Larry. He's right. *Dust Masks*, it says. In little sealed bags, lots of printing. Wait a bit, hard to read in this . . . Hey, goes right over your nose."

"Bring 'em down. All of them. Let's get out of this stuff."

Walter said, loudly. "Give one to this guy with the paint mask. Before it kills him."

Something in his voice made everybody turn to look at the man next to Walter. He'd been holding Walter, but he'd let go and was bending over, coughing.

Mouse scrambled down the truck steps, his jacket stuffed with the mask packets. He handed one across. "Here, put it on him. The thing works. No filter, but it keeps the stuff out of your teeth."

Somebody ripped the packet, and started working the paint mask off the coughing man. Walter didn't see any more. Two men in trucker jackets grabbed him and shoved him at the door of the nearby trailer.

"Come on, Mouse. Everybody inside!"

The door opened and Walter was marched in and slammed down onto a bench. "Stay put," he was told.

The man called Mouse said, "Hey, Larry. Come look." He beckoned to the big trucker. "These masks are for rock drilling, blasting, and dust storms. How long have they been on your truck?"

Larry growled. "That's the emergency kit. When's the last time we had an emergency? The safety inspector stocks it. I've never had it open. Let's see one." He opened the packet, read the instructions, tried it on, then took it off to look at it. "Humph. It works, Mouse?"

"Seems to, Larry. Takes the sand-taste out of the air, anyway."

"How many'd you get?"

Mouse counted, looked around at the men crowded in the mess trailer, counting heads. "Two short."

"Humph. Conklin ain't going out until he finishes splinting and plastering Rogers's busted leg. And Rogers is still out. You count them?"

"Yup. That takes care of the two short. I got enough for all of us then." Mouse began passing out the packets.

Larry said, "Hogan, you and Bill, get over to Barracks Two. Open Hogan's truck and get these masks in to the guys there."

"Yeah-up!"

"And, Bill," Larry stopped him. "Get on the horn and call up MacWerter at end-of-pipe. Tell him about the masks, case he don't know, and about Mister Whiskers, here." He jerked a thumb at Walter. "Mac ought to get back here."

Bill nodded, then he and the driver ducked out the door.

Larry was back in front of Walter, tapping the paper wrapper from a mask packet with one finger. He said, "Well, Mister? These are points for you. Now, how about some explaining. Who are you? What was the fight about?"

Walter answered him evenly. "My name's Walter Jenkins and I live out here in this valley. You're on my claim. The fight was because I tried to tell him you all had to pack up and get out of here before the sandstorm gets worse. Before I could finish, he jumped me. Thought I wrecked your trailer, I guess."

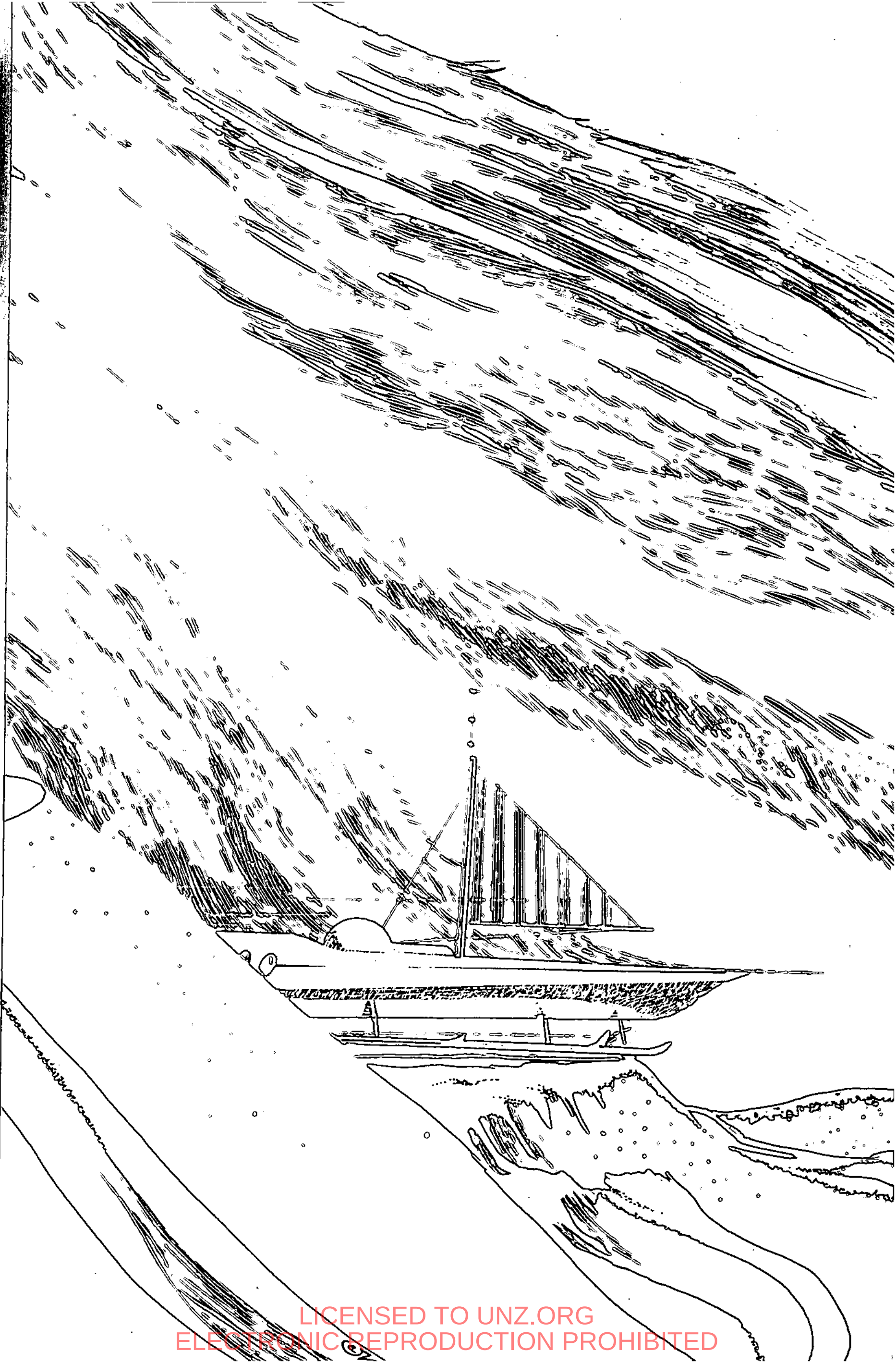
"Did you?"

"Nope. No need to. You built it stupid and the sand wrecked it. Didn't they tell you anything about my sand dunes, back in Durban, before you came out here?"

"Not me, they didn't. We got desert trucks though. Somebody must have known. You tell me. We got all afternoon."

"No you haven't! That's what I was trying to tell . . . him." Walter's ears were still hearing the singing scream of the grits. They were telling him his own timetable—the moving of the dunes down into the throat of the valley.

He said, "Look, I gotta talk to somebody. Who's running this camp? It's important. This place is dangerous, you've got to get out. Get up in the hills.



Right away! Who's the boss? You?"

Larry laughed. He waved a hand at the unconscious engineer on the table. He said, "You slugged Rogers. He was the engineer—the boss. You think you can convince him of anything?"

Walter persisted. "His second, then. That sand out there is going to get deeper—deep enough to bury this place. Look, you're a trucker. You've got to get your trucks up in the hills while they can still run. Even trucks can't move in the deep-sand. *Who do I talk to!* Listen to that wind!"

Larry said, "The wind's always been here. It was blowing when we started building. Keeps on most of the year, I understand."

Walter said, "But my sand dunes were up the valley when you started. Now they're a threat to all of you, because of the way you've built this pipeline." Walter saw he wasn't getting through to the trucker. Nobody else seemed to be interested in the conversation. The rest of the crew had drawn coffee and were trying to talk Cookie out of sandwiches. They probably hadn't heard a word. The trucker, Larry, was running things as far as this group was concerned. But wait a minute . . . he'd sent off . . .

Walter said, "MacWerter? You said, 'MacWerter.' Who's he? I want to talk to him."

Larry said, "Work boss. He runs the crew. He's out at end-of-pipe now, but he might come in. If he does, you'll talk to him, OK. That's why you're sitting there instead of running around loose in the sand. Now be good and be quiet."

Walter pleaded, "At least get your trucks started, man. If the sand blocks their ventilation system, you'll have to walk out."

The door snapped open and Bill stuck his head in. "Hey, Larry! Everybody out! Number Three trailer blew over. The side broke in and the crew's still trapped. Come on, before they get buried!"

Larry roared, "Put those masks on!" He stopped the rush of men headed for the door. "Bill, where's Hogan?"

"In his truck. He was gonna back it down so we'd have the winch to work with—and he'll May Day MacWerter."

Larry said, "Good. Get out, you guys!" He turned to look at the cook. "Cookie, you stay. Keep an eye on Rogers and our Mister Jenkins, here. If Rogers wakes up, tell him his leg's busted. . . and where we are." Then he was gone.

The mess trailer was silent; the wind-scream echoing faintly in the empty room. Walter tried to estimate how high up the wall the sand grits were hitting, but the air, backing up from the barrier of the pipeline, was turbulent and gusty. The noise on the trailer roof was as loud as it was from the side panels. The floor had stopped vibrating, though; drift-sand was probably solid beneath the trailer. Walter's time scale was shrinking.

He got up and walked over to the coffee urn. The gurgle of the coffee, as he filled a cup, was matched by a metallic clatter. Cookie was slicing bread with an oversized French knife.

He said, nervously, "If you stay back of that rail, we'll stay friendly, Mister."

Walter blew over the top of his coffee. He said, "How far is it to end-of-pipe? Could I walk it?"

Cookie said, "Four kilometers, about. On a good day you might. In this sandstorm . . . ?" He shrugged. "You're the one who lives out here. Why don't you just sit and wait for Mac. He'll believe you when he gets here. He knows about deserts, too. Talks about them all the time. He says this is a pretty valley.. Paagh! This rock pit?"

Walter said, "No time to wait, Cookie. You gonna stop me?"

Cookie said, "Only if you come back o' that rail. There's no lock on the door. I expect you move too fast for me to catch you. And I ain't going outside."

Walter started toward the door. He said, "Good enough. What you'd better do is unpack all the emergency rations you've got stored and put 'em out on the floor. They'll be needed when everybody moves to the mountains."

"You mean it, don't you?"

"I sure do. This camp's going to be covered over—buried deep with sand," Walter was at the door. "If MacWerter knows deserts, he'll know what I mean. You be ready."

He pulled his goggles down, tugged his mask into place, and tightened his grit jacket, then jerked the door open and twisted out into the sand.

The drift sand was almost knee-high and he knew, instantly, that he wasn't going to walk forty meters, let alone, four kilometers. *The truck.* Walter headed firmly in the right direction, bent against the wind's pressure and shielding his goggle lenses, as much as possible, by ducking his head into his shoulder. Walter's desert sense of direction, usually oriented to the steady grit flow, and the slope of the sand on his dunes, was equal to finding the truck. Even though he couldn't see it and the grits blew at him from all directions, he bumped into the treads only a meter from the boarding ladder.

This time nobody pulled him off the tread steps and he made his way up to the cab. He slapped the ground plate on the doorjamb, felt the tingle-snap of his static discharge, and eased himself into the driver's seat. The cabin was proofed against engine noise, and when he reached back and pulled the door shut, it cut the sand-scream somewhat.

Construction trucks didn't run to locks and keys; the engine switched on and ran fitfully until the exhaust and heat cleared the grits out of its breathing system. Then it settled down to a powerful burble. The cab's sonar was the same as the one in Walter's dome and he had no trouble locating the solid return of the pipe on his starboard side. The grits blurred the sonar pulse on the port side; this set didn't have, or need, much power. Walter wanted to spot the shape of the dune coming in, but he couldn't separate anything from the hash. However, the pipe was clear and he intended to steal the truck and find MacWerter at end-of-pipe, so the return from the pipe was all the guide he would need.

He cut in the gears, eased off the brake, and shoved his tread levers forward. The truck wobbled around for a bit. Walter was driving by ranging the pipe return on the sonar and looking out the front windshield. The windshield was Durosteel, transparent and uncrazed, but visibility was down to meters and it had also been some years since Walter had driven a tractor-truck. However, the K.M. & B. pipe crew had graded a wide road parallel to the pipe and Walter learned his controls. His course got straighter and his speed faster. The sand sailer was quicker on its feet, but the truck lumbered along. The cab was perilously high off the sand, by his standards. The truck pitched and swayed as its treads rode over the finger-dunes forming in the wind eddies from the pipe. Its weight was heavy enough to hold it into the sand and low enough in CG so that Walter had no worry about tipping over.

Walter kept the truck's speed as high as the engine temperature dials would let him. He monitored the distance recorder as the meters ticked off. Insulated from the desert in his cab, the distance dial had to tell him how far he was traveling in this bouncy can.

Walter jerked his eyes up to peer out the windshield. *Spots of light! Up ahead.* He hauled his power levers back, braking the treads. The heavy truck stopped in two tread lengths. *Lights? In the daylight?*

The bright halos in the dust came closer, and at five meters, turned out to be men. Five, six, they came straight at the truck—if Walter could see them, they certainly could find the truck—and resolved themselves into a group of ten men, roped together and carrying flares to help them hold their direction in the dust. They worked into the lee of the truck and Walter heard the rear door open.

The wind scream came blasting in. The grit noise roared inside the truck, also the hissing of the flares and the garbled, gasping voices of the men as they crowded into the van body. The flare lights brightened Walter's cab, one by one, mirroring the windshield with reflected light and showing him his own face, tense and worried. One by one, the torches flashed into the truck and then went out, snuffed into the sand, as the men carrying them climbed up the treads.

A growly voice said from directly behind Walter's head, "OK. Turn it around and get us home. We're all aboard."

Walter asked, "MacWerter?" The question was a way of letting the man hear his voice.

The voice said, "Hey! Who are you?" MacWerter slid into the co-driver's seat in one fast movement. "You aren't a trucker."

"I'm Walter Jenkins."

"The guy that slugged Rogers? What are you up to? Get out of that seat!"

Walter said loudly, "Will you listen to me! I got something to say and you guys keep telling me what to do. Damn it! I came down here to tell you what to do. Are you the boss of this crew, or aren't you?"

MacWerter soothed him, "Sure. Sure. Tell me, man. Tell me."

Walter swallowed. MacWerter still thought he was nuts, but it would have to do. He edited things he thought MacWerter would believe and started, "This sandstorm is going to get worse. Very bad. Bad enough to bury your camp. You've got to move your men and trucks up into the hills. Take all your spare food and water, and get them moving. Right away."

MacWerter said, "I'd about figgered that out myself, after our hike." There was a note of sincerity in his voice. "But . . . Walter Jenkins, huh? You live out here on this desert, don't you? Heard some scam in Durban. Came off an Outstar freighter and moved in out here, ain't it?"

Walter admitted, "You're on my claim. I know something about this valley."

MacWerter said, "I expect you do." He got up from the seat and stepped back into the van. "But I can't see you getting excited over a sandstorm. If you live out here, you'd have been through a lot of them. If they'd been dangerous, somebody in Durban would have told us about your reports. No. I can't see you getting excited about a sandstorm—or walking around in it just to tell us to get out of the wind. I think, Walter Jenkins, there is more you've got to tell me. Come on down out of that seat and tell me about it. Let my trucker take us back to camp. Them truckers got a tight union, Jenkins. You don't know the penalties I have to pay if somebody else drives one of their trucks. Come on back here before you bankrupt me."

Walter laughed, relaxed, and heaved out of the seat.

He said, "Tell him to go back two point six, three kilometers, then starboard ninety degrees, about half a kilometer. I want to pick up my sailer. And you're right. There is a lot more.

"I live on a sand dune out here, and if you don't get out right away—today—your camp is going to be buried under my whole sand dune system. I told Edwards to call you and warn you to get out. Didn't he do it?"

MacWerter called out, "Derek! Get up here and twist us out of here."

The trucker eased by Walter and started the truck moving. He asked, "You want to follow his course?" He looked over his shoulder for instructions.

Walter ordered, "Follow it! And raise somebody on the radio so MacWerter can start the evacuation. We got to get everybody out of the valley."

MacWerter said, "You are serious about running us out." He jerked his head sideways to tell the trucker to keep moving; back to camp. "Look, man, we're legal on running this pipeline. I checked again after Edwards called."

Walter said, "I'm not running you out! My sand dunes are! It's the way you built the pipe, MacWerter. It makes a wall to stop the sand. But nothing stops my sand dunes.

"Out here things go bad fast, when they don't stay good."

MacWerter sat on an equipment box, balancing against the truck's movement. He wasn't letting himself be hurried.

He said evenly, "That doesn't sound like a threat. Anybody else come running out of a sandstorm with a beard like yours, and he ought to be screaming like a mad man. . . . Well, if he was a crazy sand-man trying to drive me off his claim, I'd believe it as well as not. I walked the Panamints and the Valley for a time, back on Earth, and I've seen desert men who thought they owned the whole mountain. You don't impress me that way, Jenkins. I'll tell you again, we're not claim jumping."

"Hell, I know that. Look, I live out here. You know what they call my place? You got a chart?"

"Yep." MacWerter pulled a map roll out of the desk behind him. "Walking

Hills, isn't it? We figgered it meant earthquake country—but this bedrock's stable."

Walter unrolled the chart. He said, "Not earthquakes: sand!"

"So, what. We'll ride out the sandstorm OK."

Walter was getting tired. He said, "Ah, hell—look!" He pointed at the map. "My sand dunes. See. Walking Hills."

MacWerter said, "Yeah. That where all this sand's coming from? Blows a long way, doesn't it?"

Walter said, intensely, "Your map's wrong, MacWerter. My dunes move! They move. *Walk!* Right now this dune is down here! On top of you! This ground-sand is the front edge of it, and it's almost knee-high, now. By dark, the wind-sand will be up over a man's head—six, seven, meters. That second dune will be on top of you by morning! And there's another one right behind it."

MacWerter said calmly, "Enough to bury the pipe, huh?" He was taking Walter seriously despite the understatement.

Walter said grimly, "Worse. Your pipe acts like a wall. I don't know what will happen. I don't ever try to block off the sand grits when they are blowing. They can grind their way right through anything. I don't know what will happen when you try to stop —block—a whole dune. . . . I just don't know.

"But I do know you've got to get these men out of the valley."

"These dunes are big, huh? Yeah, I can see the scale.

"OK, we bug out. I haven't anything capable of digging out from under that much sand, anyway. I'll have to get some digging equipment sent out from Durban. I'll go over to radio shack as soon as we get in."

Walter said, "Do it from your truck radio. You've got to leave now. In two hours the drift-sand will be too deep for trucks."

MacWerter said, "It'll pile up against the pipe, you mean. Yeah!" He leaned over and banged against the driver's seat. "Take me over to the quarters trailers, Derek. When you pick up the camp."

Derek said, "We're here now," He pulled on his brakes, geared the big truck down to a slow forward crawl. "I'm looking for the trailers, now. Got 'em on sonar, but—*Hey, look at that!*" He began to swear softly.

MacWerter, alerted by the tone of his voice, stood up to peer out the windshield. The truck was rolling by the tipped trailer and the other living quarters trailer was just becoming visible in the swirling grits. The smashed wreckage, panels and torn metal fluttering in the wind, were barely recognizable as parts of a trailer. The damage looked like an explosion, until MacWerter glimpsed some holes punched in panels and a warped beam bent upwind.

He said, "Somebody pulled that apart to get the men out. See if you can raise them on the general frequency, or the two-way PA."

"Oh, for . . . sure," Derek snapped his fingers, crammed a headset over his ears, and switched on the receiver. "Got 'em. It's Hogan. He's got half the crew in his truck; the rest are in the mess trailer. Three injured, nobody bad.

Rogers broke his leg. Conklin is practicing medicine on him, but doesn't want him knocked out on painkiller until we get out of the sand.''

MacWerter said, ''Sounds good. Better than it looks with that wrecked trailer. Put me on the PA frequency.'' He reached for the co-driver's headset.

Derek said, ''You got it.''

MacWerter said, ''This is MacWerter!'' He was the crew boss again, talking into the headset mike. ''Pin your ears back, everybody. We're bugging out of here. Bug Out! Bug Out! Pack it up. Everybody out. Everybody out. E-kits; water rations. We're going to get into the mountains until this sandstorm blows over. Get aboard the trucks. Drivers check in when your crew is aboard. I want a head count. Hop it! We're moving!''

Derek moved his track levers, turning the truck toward the mess trailer without orders and braking with the back of the van as close to the doors as he could maneuver. In this visibility he didn't dare back up.

MacWerter said, ''Here's the hut roster, Derek. Get the names of everybody Hogan's got on board and all the guys we take on here, too. Don't miss anybody.''

The back doors of the truck rattled as someone banged on them. MacWerter went down to the end of the van, glanced back to motion everybody into their breathing masks, and opened the door. Two of his crew were there, each carrying a five-man ration carton and a three liter water pack.

Cookie had taken Walter's advice and opened the trailer's emergency lockers.

''We got five more boxes, Mac. But only two more water. Cookie's got two guys filling jerry-cans with tank water. Wants to know if you want him to pack out the can goods? That'll take a minute.''

MacWerter said, ''Tell him, no. Bring the emergency stuff and come on out. The rest of you get aboard and stay put. Stow those boxes. We're gonna get crowded in here.''

The men crawled in. Another truck, the crew's Number Three van, crawled out of the grit-haze and parked. MacWerter hand-signaled the box-laden men coming out of the trailer, splitting off half of them to go in the other truck. He took five more men past him. One of them was laded with a cluster of plastic water bottles. Then one last man scrambled in carrying a canvas pack that clanked and rattled. The pack bumped enough knees to get him cursed at and pushed up toward Walter's end of the van.

''What are you toting, Cookie?''

''You broke my leg.''

''What's in that sack, pipe?''

Cookie plumped himself down beside Walter and grinned.

He said casually, ''Wait until they try to eat those rations cold. I brought some cooking pots.''

He recognized Walter, ''Hi. You found MacWerter, I see. Guess he was easier to talk to than Rogers, huh?''

''He listened.''

''Good enough. I was glad to get out of here. The dump was breaking up around my ears. I like to cook in a warm, tight kitchen and that trailer was dancing and shivering like water on a griddle.''

MacWerter bellowed from the back door, "That's all we can hold! You other guys get over to the Number Three van, fast." He signaled with his arms, the men out in the wind and grits couldn't possibly hear him.

Derek called out, "Hogan's waiting for us, Mac!"

MacWerter said, "OK, they made it." He pulled the door shut, and came back to where Walter sat. "Let Hogan wait. I gotta check."

"I done it, Mac. We all got out." Derek waved the personnel list.

MacWerter's voice was cold. "Have 'em do it again, now, while everybody's buttoned up. I want to know, man. We ain't leaving nobody behind."

Derek began nodding his head, spoke into the headset, and started checking the list. After a minute, he turned to survey his own van, dropping his eyes to the name list, raising them to search for a face, then back to the next name. He finished by thumping his chest with his hand and looking at Walter.

He reported to MacWerter, "All here, Mac, plus one—the man with the whiskers."

MacWerter said, "Walter Jenkins." He spoke loudly to introduce Walter to the men in the van. "You've met him, use his name. He came in to warn us about this sandstorm." He was brief because he wanted to get the other trucks off as quickly as he could.

He ordered the trucker, "OK, Derek, send 'em off. Get 'em moving. Course, ninety degrees, magnetic; up the road. Follow the pipe up into the mountain pass. Go all the way to the summit. We'll be along last. Bug Out!"

He took a deep breath and turned to Walter. "Now. What's out on the end of that dogleg you gave me earlier?"

"My sailer. A wind-powered sand-ski. How do you think I got all the way down here across the dunes—walked?"

MacWerter said, "I've known desert men who thought they could walk to hell and back. Heard about some who tried it, too. I thought you said your sand dune moved down here. Didn't you ride it?"

Walter said, "This storm's not my sand dune. There's three dunes in the system. Mine's still two days away. But it'll be here—or go past your end-of-pipe, probably. Go get my sailer, huh, MacWerter. I got to have some way of getting back home when this is all over."

"OK. You did come all the way down here to cry wolf. Guess we owe you one.

"Derek, take her out. Half a kilometer, and watch your sonar. Mr. Walter Jenkins has a toy out there. We don't want to run it down."

Derek grunted and jerked the truck around in a tread-turn and started it crawling.

Walter said, "There's a beeper operating on 437 kilohertz. Can you pick that up?"

"Kilohertz?" Derek punched numbers into his receiver. "Kind-a low, but I can get it. Got it! Pretty close to get a bearing."

Walter said, "You'll find it." He sat back and folded his hands. He'd done what he had come down to do. The pipe crew was on its way out of the pipe camp. He still had a self-timed urge to move, do something, to hurry, but that was born of the wind noise and grit-violence down here in the throat area of the valley. It came mostly from the fact that he was in the middle of a sandstorm. Walter was reacting to the signals from his desert. The grits were in turbulent movement, so he felt he had to be moving, too. To counter the feeling, he forced himself to lean back against the van wall. He had gotten the trucks moving out of the valley and he was moving in this one, out to pick up his sailer. He was doing something even if it didn't result in much physical action on his part. He sat back, outwardly still, if not relaxed. The worry had come with the wind, but the wind would change when the dunes moved.

The truck ground to a halt.

Derek reported, "Mac, my sonar says something small is out there. Ten meters out, but I can't see it. If I go any closer it'll be in our shadow. Anybody want to go for a walk?"

Walter pulled his mask up. He said, "I'll go out. It's my sailer."

MacWerter said, "I'll go with you. I don't care if you do know this desert. The visibility out there is zilch. And I want two men on our life line. Safety is safety."

Derek said, "Take out the port line, Mac. Then I can drive upwind of you and give you a lee to work in."

MacWerter said, "Uh huh. Test my beeper." He clicked on the signaler at his belt with the heel of his hand. A light and speaker on the driver's console responded. "Ready, Walter?" He asked, next. Walter hunched closer to the van door and put his goggles on for an answer.

MacWerter pointed to the two men nearest the door. He said, "You guard the safety reel, will you?" Then he called a warning to the rest of his crew, "Sand coming in!" and cracked the door.

The violence outside came back in.

MacWerter swung out and down the truck's ladder, struggling with the wind thrown grit-blasts as they whipped off the contours of the truck. Walter followed him. They moved up to the front wheel of the truck, hooked to a safety line reel, and stepped away from the truck about two meters. The two safety men came up by the reel.

MacWerter let Walter hook on to the deadeye in the end of the line and walk ahead of him. MacWerter raised his arm as a signal to Derek in the cab.

The truck's man-high front wheel began to revolve slowly as compound gears drove it ahead at walking speed, the driver following the crouched men, dimly seen beside his port wheel.

Five, seven, ten meters; Walter fought his way upwind, the needle on his repeater compass held within centimeters of his goggles. The grit level was swirling around his head, tearing at his hood. The goggle lenses wouldn't last long. MacWerter was right. He couldn't sail home, upwind, in this. . . . And MacWerter had to get his truck up in the hills soon, too. The truck's Durosteel windshield wouldn't stay clear forever, and the grits would get at the treads if they had to do much wandering, driving blind.

The flasher on his sailer winked at him—haloed by sand-haze. Walter grabbed hand holds on its hull and walked his way to the bow. The forward ski was buried in the sand. The sailer had risen as the flow-sand built up around it. The skis were designed to float its weight, but the anchor rope was straight up and down and had pulled the bow under the sand. The dune was moving in fast. Walter had never been outside while his dunes rode through this valley throat. He usually kept indoors in his dome, until the violence was over. The timetable he had in his head was being rushed by the speed of the dune system movement. Another half hour and his sailer would have been buried, maybe smashed by the dune-sand.

The heavy, growling shadow of the truck crawled past and stopped.

MacWerter yelled in Walter's ear, "Load it on the side, or leave it?" He was pointing to the truck's equipment racks.

Walter said, "Load it. Can't get home without it." He snaked some slack in the safety line and tied it onto the sailer. Then he cut the anchor line and the life-line he'd used to walk down to the pipe camp. The piton and the life-line both were hopelessly buried. With MacWerter's help he slid the sailer over to the truck and folded the mast down. The two men locked off the safety reel and came to help. The outboard skis were telescoped in against the body pod, the whole sailer lashed up against the truck-rack. MacWerter push-ordered everybody in the back door, Walter included, and took the safety line back to the front of the truck. He let himself in the front hatch and said, "Get us out of here, Derek. Back to the pipe and up into the hills."

Derek said, "Better look at this first, Mac." The softness of his voice brought MacWerter up beside him quickly. The driver was pointing at the sonar scanner. "It's on mid-range sweep," he explained.

MacWerter snapped, "Jenkins, get up here!" He showed Walter the screen. It was displaying a solid return, a curving wall reflecting the sonar signal clear across the screen and two-thirds of the way up the altitude reticule.

"No way we can be that close to the mountains."

Walter shook his head. He said, "The sand dune. The valley narrows down here, but everything has to go through The Slot. The wind, the grits, and all the sand in the dunes. They tend to build up vertically. Get kind-a tall, but they all go through. Never seen one from in front before. Kind of spooky, isn't it?"

Derek said, "Spooky? I'm scared spitless. That's close enough to fall on us."

MacWerter said, "It is falling on us, you nit! In little pieces all around. Can't you see them?" He slapped the trucker on the shoulder. "Get us out and rolling before we have to dig your treads free."

"You bet!" Derek worked his levers and the truck began to travel.

Walter wedged himself back into a sitting place and began a fitful worry about his dome. The dome's autopilot had broad limits built into it and the steeper dune crest wouldn't hurt it too much. The dome wouldn't fall out of the curl, or tumble, or anything like that; it would ride through The Slot along with his dune. It had done it before. But the inside would be rattled and jumble-puzzled into a mess by the time he got back. . . .

Somebody broke open a ration box,

handed around hot-cups. Walter took one and settled back to drink his coffee without spilling. His latest worry slid away, filed among the other things he couldn't control.

Derek called out, "I got the pipe! Turning on the road. Hey, Mac, look at the pipe, will ya?"

MacWerter leaned around to the driver's side window and exclaimed, "For God . . . ! Jenkins!"

Walter pulled himself up to where he could see. The pipeline was a bright-silver. The dark paint and the insulating wrap had been etched away, the bare metal polished by the wind-driven grits until it reflected even the dim sunlight coming through the sand. Walter found one of the concrete bolsters through the dust. He saw round corners, rough irregular lines where the material was melting downwind to add to the airborne grit.

Walter said, "Nothing blocks the sand. I told you."

MacWerter's crew began yelling their curiosity.

"Hey, Mac?'

"What you got?"

"We can't see back here."

"What's the mystery?"

MacWerter said, "Sit down!" He came back into the van himself. "Our pipe is all bright, shiny metal. It's getting sandblasted. So is this truck, I suspect. Anybody want to volunteer for paint detail when this is over?"

There was a satisfactory silence and a great deal of attention to the coffee.

The truck clattered on, and after a time the floor began to tilt. Cookie started to complain that Walter was sitting on him.

Walter heard the grit-sound on the outside of the truck change. The screaming hum no longer came from the top of the van; after an interval, it was only vibrating the floor under his feet. The truck was rising up out of the blowing grits. They were on the mountain slope of the road and climbing. Derek was pushing the truck as fast as the limits of visibility would let him.

Suddenly, within the span of a minute, the wind-noise stopped. So did the conversation in the van. A burst of two or three loud words cut off, as the speakers felt the silence. The lack of noise was startling and implied menace, something the men couldn't see, was outside.

Derek said, "Mac!" His tone was sharp enough to make MacWerter jump. "I've got our trucks in sight. They're bunched up."

MacWerter said, "I told them to go over the summit!"

Walter said, "You're out of the wind. That's better. Why not camp here?"

"Out of the wind? Yeah. Sure. The noise, huh?"

Walter explained, "We're in a wind shadow. Must be the mountain pass. It's a good place to stop, Mac."

Derek said, "And we're here. I can't go any farther." The view out the windshield, free of grits, showed all the pipe crew, both trucks and two big bladedozers, parked in a row on a flat turnaround beside the pipeline. A figure, one leg encased in white, was propped against a truck wheel, motioning them in to park. Both Derek and MacWerter recognized him.

MacWerter said, dryly, "Rogers.

And he's still mad to judge by the way he's yelling. Jenkins, maybe you'd better stay in here and help Cookie set up a meal, huh?''

Walter agreed wholeheartedly. ''Yep. He'll cool off. But I'll stay out of your way while you get organized. We're going to be here a little while.''

MacWerter said, ''Wouldn't be surprised. We can sleep in the trucks . . .'' He took a look around him at the crowded van and finished, ''. . . or under them. The aid kits have enough thermal blankets.

"OK. Everybody out and take a look at your new home. Cookie, you stay here and get something hot cooking. I'll make this truck the mess hall. Send all the rations over to you. OK?"

Cookie said, ''Right, Mac.''

The back doors were opened and the crew piled out noisily. MacWerter turned at the door, and said, ''I forgot to ask, Jenkins. How long you think we'll be here? These sandstorms last long?''

Walter said slowly. ''There are three dunes in the system. The first is hitting your pipeline now—tonight; the second, tomorrow night; my dune will maybe miss the south end-of-pipe. Figure three days and then you and I can go down to take a look. Four days, and you can move back in on bare rock. The sand will be clear.''

MacWerter scratched his chin. He said, ''Four days? Yeah, four days. Well, watch the food, Cookie. Tell me if we got enough.''

Walter said, ''You'd better call up an air drop from Durban. Gonna need more than four days. Your camp down there will be gone.''

''That bad?''

''That bad.''

MacWerter nodded, absorbing the statement, but not understanding it. He left, organizing the camp was a job he could understand—and do.

Walter went up into the driver's cab and opened the right-hand hatch. He stood up on the seat and looked back toward the valley. The swirling, tan clouds of the sandstorm filled the valley behind him, clear to the Port Mountains. He was looking at the top of the sandstorm that was driving his walking dunes through The Slot. He was seeing the irresistible, wind-driven grits as they drove against the blocking pipeline.

Walter stood there, on top of the truck, and shivered slightly. He watched the Walking Hills move over MacWerter's pipe camp.

Three

Sergeant Edwards showed up at the end of the fourth day. He was visible on the back trail, a dust cloud near the black line of pipe just after noon, and he rolled into camp about an hour after sunset. He was riding a fast carrier, rolling on solid-tire wheels and mounting a 20 mm rapid-firer. Only a policeman would put up with the pounding of solid wheels over rough ground, and drag a cannon along on a planet where there wasn't anything to shoot at. The only virtue in Edward's carrier was its speed. He was three days out of Durban. . . . Unless he'd jumped off before MacWerter broadcast his call for help? No, he'd just been traveling fast. There was another carrier following up the sergeant's track. Its lights were waving along the rock, a twitching finger of yellow-white indicating a hot-throttle driver.

Walter stayed put at his cooking job; he'd teamed up with Cookie the first night in the Turnaround Camp. He was supernumerary to MacWerter's crew and helping the cook relieved MacWerter of the task of finding something for him to do. The camp was full of hardworking pipe men, without a pipeline, and MacWerter was busier than a hunting dog, trying to keep them doing busy-work and out of trouble. The six or seven fights were par for that crew, almost normal, definitely healthy. But Walter stayed to himself, partly out of personal inclination, and partly because he didn't want a revival of the idea that he was to blame for the wrecked pipe camp.

He pulled the propane heater unit out from under the big coffee pot, turned it off, and slid a chemical warmer unit under the pot. Cookie had started boiling the second coffee pot when the news of sighting Edwards rustled across the camp. He was breaking some more ration blocks into the stew-pot, extending the remainder of the supper he'd just fed the pipe crew. Cookie had a rustic philosophy about visitors; if they arrived at meal times they got fed. Business, fun, frolic-or-fight, was secondary.

The carrier roared into the turnaround and braked. The pipe crew gave it a loud welcome and swarmed around the carrier as the crew unbuttoned the hatches and climbed down. MacWerter kept the policemen from getting mobbed by leading Sergeant Edwards straight over to the food line. The carrier driver and a third policeman followed him closely. Half the pipe crew tagged along behind, jostling to get in a back slap or shout of welcome. The rest trotted off toward the road to watch the oncoming headlights of the second carrier.

". . . Got some rations and plenty of water aboard," Sergeant Edwards was saying to MacWerter as they came up to the coffee pots. He hadn't been able to make himself heard in the middle of the mob. "And I've got a full aid kit on board. There's a medic riding the K.M. & B. carrier behind us. You got any injuries?"

MacWerter said, "One man. Rogers, the engineer, got a broken leg. A trailer fell on him. Walter Jenkins got the rest of us out before anything else fell over. Couple of the guys got banged around, but nothing serious. Have some coffee, Sergeant. You know Walter Jenkins, don't you?" The introduction was tacked on as Walter handed the policeman a cup of coffee.

Edwards said, dryly, "I've seen him a couple of times, in Durban. Hello Walter Jenkins. Seems like you caused a lot of trouble down here. Any of it actionable?'

MacWerter said, "Now wait a minute! We got run out by a sandstorm. Walter did all he could to warn us to get out. He's clean. . . . Leave him alone. He couldn't stop a sandstorm, could he?"

Walter said, "Nothing can stop the dunes. That's what I been telling you. Stew's hot, Sergeant. Sit down and eat up."

Edwards said, "We'll eat up, OK." He was motioning his two men into line ahead of him. "But I don't think we'll sit down for a while, if you don't mind. That's a rough track out from Durban and we hurried. Sitting down is the last thing I want to do."

The driver put in, "Yeah." He was moving with noticeable stiffness. "Lean me against something. Coffee?"

Walter poured for him and Cookie had a stew bowl ready.

"I'll wait up 'til the company truck gets here," Edwards was saying. "They sent out another engineer to evaluate the damage. No use telling the story twice. Then, I want to get some sleep. We're all plus on hours. First light tomorrow, maybe you can take us down to look at the pipe-camp, huh, MacWerter?"

MacWerter deferred the answer. He said, "What you think, Walter? Can we?"

Walter mumbled, "Nothing to see." They still didn't understand. The whole thing was just a troublesome sandstorm to them. The mass and violence of his sand dunes in the narrow Slot part of the valley . . . Well, as a matter of fact, he had never seen that. He'd been holed up in his dome and ridden through every time. He had only his sonar pictures and imagination to witness what the dunes could do—instrument readings and his experience of their inexhaustible destructiveness under normal wind conditions, if resisted in any way.

MacWerter urged, "You said four days."

Walter's mental clock, deprived of the wind and grit signals he usually relied on, might be off a little, but not enough to matter. He nodded and said, "The dunes will be gone by now."

MacWerter said, "Then we can go down and look." He turned to Edwards, making his decision in his abrupt way. "My truck or yours?"

Edwards said, "Take mine." He reached for his stew bowl. "Got some special gear on board. Also I don't want to take too many people."

MacWerter said, "Me and Walter." He nodded in agreement.

Edward said, "And the K.M. & B engineer—Larson's his name. My driver and radio op . . . that's six. Carrier won't hold any more. Enough for a survey, anyway." He was talking around his stew spoon.

MacWerter said, "I'll lay it on."

Edwards said, "Hear that, guys?" He was talking to his crew. "Take your seconds back and stay with the car." The policemen hadn't left the food line and Cookie was filling up their bowls again. "Briscoe, wait 'til the other carrier gets here, then send off an arrival report to the Post. No details, just time in, for both carriers."

The radio operator groaned, "If I can still climb back aboard."

"Throw out the sleep gear. We'll offload the rations tomorrow before we leave."

"Good enough!" The two crewmen moved away. So did most of MacWerter's crew, having heard enough for cigarette conversation and rumor factory consumption. One or two more came up for extra coffee and then faded. Turnaround Camp began to settle down for the night.

Sergeant Edwards took another cup of coffee from Walter, winked at him—their last meeting in Durban had been over cups of stronger liquid, in Durban's only bar. Then Edwards took

MacWerter's elbow and drifted away to wait for the company carrier to come in.

Walter kept on with his chores behind the food line. He still had reasons for staying out of sight for the rest of the night. He had an idea of what the survey party would see in the morning. He was still practicing his desert-dweller's habit of blending with the scenery.

The police carrier bucked and slithered through five or six sand eddies on the way down the mountain, but the air was clear and clean. The steady desert wind was blowing through The Slot with its normal force. The sand grits had gone. And so had the dunes. The road and the valley floor was bare rock again, clean, nothing marring the level surface.

Edwards said, "I thought you said you were blown out by a sandstorm. I expected to find your camp buried in sand."

MacWerter said. "Me too!" His voice hollow with horror. "Where is my camp? God, where is the pipe?"

The police driver said, "Look there! The end of it is broken up a bit. Can you fix it?"

They were barely down off of the mountain track, the valley in front of them was bare of any sign of the work camp. No trailers, no machinery . . . and the pipeline . . .

The pipeline ended just to their right—the split flanges polished inside and out to a sun-sparkling silver.

Edwards said, "That's not your end-of-pipe. Did you hear any explosions?"

"Explosions?" MacWerter pointed. "Look!" He stabbed a finger. In line with the pipe-end was a white-grey rectangle, appearing as if it was painted on the desert rock floor. "And there!" Another rectangle along the same line. As MacWerter's finger pointed, the men in the carrier could see other rectangles spaced at regular intervals out across the valley.

He said, "The concrete bolsters!"

The engineer, Larson, gasped as he recognized the power and energy that had ground those buttresses off flush with the rock. The steel ends of reenforcing rod were still there in those grey rectangles, spotting them with a domino pattern of polished metal.

MacWerter said, "Explosion? We had seven kilometers of pipeline out across that valley. Solid, well-built pipe. I built it, myself. You could have heard that kind of an explosion in Durban!

"Jenkins?" He turned. "What the hell happened?"

Walter said, simply, "My sand dunes. You built a wall across their path. Here in The Slot, where they move the fastest. They just tore it down." The amount of sheer destruction was a little appalling, even to Walter. He had expected his dunes to wreck the camp: but not this broom-clean sweep-up. The moving body of sand had taken everything with it. The grits had torn the camp apart; the dunes had walked away with the pieces. There was no reason to amplify his simple explanation, Walter just repeated it. "They tore it down."

Larson objected, "That would take a hurricane, or worse,"

Walter said, "A hurricane filled with a sand-blast. You can't stop the grits. I kept telling you."

The engineer said, "Doesn't look like it. What do we do now, MacWerter?"

MacWerter snarled, "Start over again. What else? I've never quit a job yet. But I'm not going to do it this way again. We'll need a whole new plan. You're going to be the engineer instead of Rogers, I take it? You come up with the design; I'll build it."

Larson said, "Right. Throw an expansion loop in it here, then ditch it in the bedrock. Insulate the pipe for seasonal temperature changes. Plastic seal on top to make a smooth surface, huh?"

MacWerter agreed, "Should have been done that way in the first place. Hindsight! I'll have to blow the ditch in with explosives. Got any?"

"As a matter of fact, yes." The engineer and MacWerter were thinking on the same wavelength. "Back in Durban. It was brought in for a road job, but this comes first; more profit in the gas well. And we've got no other trenching equipment on the planet, so we'll have to use ditching explosives. I'd better get a carrier back to the company offices."

MacWerter said, "I'll need some more equipment from Durban, too.

"Sergeant Edwards, your radio can reach Durban, can't it?"

"From the top of the pass, yes."

MacWerter said, "Then let's get back and get to work.

"Or do you want to see more, Larson?"

"No. Did you get a photo record of this, Sergeant?"

"Yes. We've been recording all the way down. Do you want to ride out to end-of-pipe?"

"No. I've got maps in my carrier."

Walter spoke up, "MacWerter!"

"Huh. Yeah, Jenkins? After what you did for us I'm listening to anything you've got to say."

"No. No ideas. You guys know how to build a pipeline. I just want to get home. I got to get back and see how my dome rode through all this. Can you bring my sailer down here?"

"Hell, yes! I keep forgetting that you live out here. Think your place is wiped out, too? Do you want somebody to go with you?"

Walter said, "No to both. The dunes have ridden through here before. I'm pretty sure everything held together. Just let me get home and find out, will you?"

"Yeah, sure."

Edwards said, "Turn us around, Bud. These guys have got things to do."

Four

Later on that morning, Walter shook hands with the truckers: Derek, Larry, and Mouse. They were unnaturally quiet. The drive out to the trailing edge of the sand dune system, through the vacant valley-site of their pipe-camp, had been sobering. They'd only now come to realize what they owed this whiskered sand-dweller and his frail sailer sled. The handshakes were bone-crushing in an attempt to express something none of them had words to say.

Walter gave his sailer a running push, tightened in his lines, and let the wind carry him out into the dunes. Sergeant Edward's instruments had located his dome and given him a bearing on its beeper. He let the sail out and reached down-wind, climbing up the back slope of the dune system. His mind was already beginning to relax into the wind-time pace of the dunes. The hiss of the grits against his runners and the sail, was a soothing sound.

He worried briefly about what he would find at his dome, but not actively. The dome would be all right—some house cleaning, but nothing more. A more important set of thoughts began to form as he rode up onto the back slope of the number two dune. Walter chuckled, loudly.

For years he had been riding his dunes up and down the valley, living with the grits and at the pace of the dunes themselves. He'd been satisfied with the solitude and the serenity—even the steady-blown grits-wind was calmness and order of a sort. He'd expected nothing more. A nodule, here or there, came to him out of the sands, but he sought nothing else. And now . . . His dunes were giving him a treasure trove. In a marginal, import/overhead Company town like Durban, a treasure priced higher than gold or jewels. His walking sands would make him rich. He'd just have to wait. The dunes would do—had done—the rest.

In about a month, the dune system would reach the end of the valley and reverse itself, as the yearly wind cycle changed. The dunes would march back again through The Slot narrows.

The pipe-crew would be ready this time; no worry there.

Walter's dome would ride the dunes, but this time, as the dunes moved, they would uncover all the debris they had torn apart and blown down in this pass. . . .

Walter's prospecting tours on the trailing edge would take on a new interest. There would be broken machines, pieces of trailers, torn hunks of pipe—seven kilometers of pipe. . . . Bit by bit, MacWerter's camp would be uncovered as the dunes moved. And it was all on Walter's claim. . . .

He tightened his sail lines, speeding up the sailer. Suddenly, Walter was in a hurry, desert pace or no. He had mentally counted the extent of his riches—the gift of the blowing grits and walking sand dunes—and he was in a hurry to get started on his new business.

Walter Jenkins, the desert scrap-metal king! ■

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THE ANALYTICAL LABORATORY

The authors, artists, and editors thank you once more for your votes in our annual poll on the previous year's issues. This is the most meaningful way you have to convey your appreciation to those who do an especially good job of entertaining you; and the more votes we get, the more meaningful it is. The turnout this year was not quite as large as we'd hoped, and we hope that next December you'll remember that *your* vote is genuinely important.

It should be important to you, too. The feedback your votes provide helps *you* by giving us a better feel for what you do and don't like. That way we'll have a better idea of what to offer you in the future.

To review the procedure, we have four categories: novellas and novelettes (one category), short stories, fact articles, and covers. In each category, we asked you to list your three favorite items, in descending order of preference. Each first place vote counts as three points, second place two, and third place one. The total number of points for each item is divided by the maximum it *could* have received (if everyone had ranked it #1) and multiplied by 10. The result is the score listed below, on a scale of 0 (nobody voted for it) to 10 (everybody ranked it first). In practice, scores run lower in categories with many entries than in those with only a few. For comparison, the number in parentheses at the head of each category is the score every item would have received had all been equally popular.

NOVELLAS AND NOVELETTES (0.56)

1. "Ode to Joy," Dean McLaughlin (2.24)
2. "Home Is Where . . .," Maya Kaathryn Bohnhoff (1.74)
3. "Contact," Jerry Oltion & Lee Goodloe (1.30)
4. "Rescue Run," Anne McCaffrey (1.03)
5. "Gold," Isaac Asimov (0.88)

SHORT STORIES (0.53)

1. "The Cold Solution," Don Sakers (1.62)
2. "A Roll of Round Dice," Stephen L. Burns (1.20)
3. "Enemy of the State," Jack C. Haldeman II (0.99)
4. "Business As Usual," Amy Bechtel (0.93)
5. "Driven By Moonlight," Sarah Zettel (0.84)

FACT ARTICLES (1.54)

1. "The Mote in NASA's Eye," Charles Sheffield (2.77)
2. "Mars Direct: A Proposal for the Rapid Exploration and Colonization of the Red Planet," Robert M. Zubrin & David A. Baker (2.20)
3. "Global Catastrophes and Mass Extinctions," Jeff Hecht (2.17)
4. (tie) "Hydrogen Time," Marc Davenport (1.83)
   "Whatever Happened to the Little Ice Age?" John Gribbin (1.83)
5. "Once and Future Mars," Martyn J. Fogg (1.50)

COVERS (1.54)

1. (tie) December: Nicholas Jainschigg, for *Glass Houses* (2.94)
   Mid-December: Kelly Freas, for "Try a Light Touch" (2.94)
2. July: Val Lakey Lindahn & Sean Lakey, for *Barrayar* (1.97)
3. March: Nicholas Jainschigg, for "Den of Sorrow" (1.94)
4. January: Broeck Steadman, for *Gloriously Bright* (1.91)
5. April: Nicholas Jainschigg, for *The Great Unknown* (1.88)

This year we had one tie, in the cover category, while each of the prose categories had a clear winner and some highly regarded runners-up. From time to time we get the suggestion that we divide the novellas and novellettes into two categories; I prefer not to do that since making the categories too small dilutes the distinction of placing high within one. However, if you'd like to consider them separately, the Bohnhoff and Asimov stories are the top two novelettes, while the others are novellas. (Incidentally, when you vote next year, please remember that the category of each item we publish is identified both in the Table of Contents in that issue and in the Annual Index. We cannot count votes for a piece in any category except the one it actually belongs to; and we don't count votes for serials [novels] at all, since we virtually never have more than three in a year.)

NATURAL WORMHOLES: SQUEEZING THE VACUUM

John G. Cramer

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This column is about a new development in the theory of wormholes. At Vanderbilt University, David Hochberg and Thomas W. Kephart have discovered that gravity itself can produce regions of negative energy. Within these regions, we may conjecture, stable wormholes may form naturally, particularly during the early Big Bang. A wormhole is a geometrical shortcut in curved space-time with the topology of a cup handle which, in principle, allows movement from one point in space-time to another, without the necessity of traversing the intervening space-time interval. This provides a physical basis for two traditional gimmicks of science fiction: faster-than-light travel and time travel into the past and the future.

But any such wormholes, it had seemed, would have to be made and operated by a technological civilization far in advance of ours. With the new work, however, there is a plausible mechanism for the formation of stable natural wormholes. We'll discuss this after a brief summary of the status of wormhole physics.

My June 1989 column, "Wormholes and Time Machines," described the breakthrough work on wormholes by Kip Thorne and his group at Caltech. At the time, Thorne, Morris, and Yurtsever (TMY) had just published two papers demonstrating the possibility of stable wormholes and presenting a new class of wormhole solutions to Einstein's field equations. They used these to argue that a sufficiently advanced civilization might stabilize a wormhole and use it both for faster-than-light travel and for travel backwards and forwards in time.

It has long been known that *lorentzian* wormholes (the kind discussed here, as distinguished from the unrelated *euclidian* wormholes that Stephen Hawking, Sidney Coleman, and others conjure with in quantum gravity studies), are intrinsically unstable in field-free space and will snap shut so quickly that one cannot pass even a single photon through. What TMY discovered is that a lorentzian wormhole can be stabilized by creating a zone of *negative energy* in the wormhole throat, the place where it has maximum space-time curvature. They suggested creating the needed negative energy region by using a "parallel plate capacitor" made with a pair of superconducting spheres carrying huge electrical charges and separated by a very small gap; employing the Casimir effect (see my column "FTL Photons" in the Mid-December 1990 *Analog*) to make the zone of negative energy by suppressing electromagnetic fluctuations of the vacuum and reducing the vacuum energy to a value less than zero. In the TMY scenario, the hypothetical advanced civilization (one that could convert whole suns to mass-energy for civil engineering projects) would extract from the "quantum foam" one of the many wormholes that wink into and out of existence at ultra-small distance scales, expand the selected wormhole to macroscopic dimensions by adding energy, and stabilize it by placing the two charged superconducting spheres in the wormhole mouths (or portals). The portals could then be transported to widely separated regions of space to provide FTL communication and travel.

TMY pointed out that if one wormhole portal was accelerated to a velocity near that of light, kept at that speed for a year, and then decelerated and brought back to stand in the laboratory beside its stay-at-home portal twin, the pair of portals would constitute a time machine that could be used for two-way communication and transport one year into the future or one year into the past.

My second wormhole column, "More about Wormholes—To the Stars

LAST CHANCE FOR O2 FOR 9,537,000 PARSECS
'92

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in No Time,'' in the May 1990 *Analog*, elaborated on some of the remarkable properties of wormholes when used for faster-than-light travel. The time travel and space travel aspects of a wormhole could combine under some scenarios to produce a near-zero waiting time for sending an accelerated mini-wormhole to a selected star system, expanding it into a useful portal for material objects, and using it for FTL transport.

However, lorentzian wormholes have their problems. The TMY scheme, while valuable as establishing an in-principle method of stabilizing wormholes, would be very difficult to implement in practice, even by the hypothetical advanced civilization. The two superconducting spheres must be suspended with a very narrow separation, without external supports to hold them up or precisely position them, in a delicate balance between gravitational and Casimir forces pulling them together and electrical repulsion of their charges pushing them apart. The electrical charges needed for the two spheres are so large that there would probably be violent electrical discharges to the surroundings or the FTL traveler.

As a device for time travel or FTL travel in SF stories, wormholes have a number of limitations that may get in the way of the plot. For example, (1) the wormholes must be created by a civilization with technological capabilities that far exceed ours, (2) they cannot be used for FTL travel to some selected destination until a wormhole portal is sent there at sub-light speed, and (3) they cannot be used for time travel to a time before the wormhole was created. Fortunately the new results provide a fix for all of these problems, at least at the level of SF writing.

As it turns out, wormholes may come prefabricated by nature. Hochberg and Kephart have discovered that gravity itself can produce regions of ''squeezed vacuum'' characterized by negative energy within which natural wormholes might form. To understand this new result we will need to discuss the ''squeezing'' of quantum mechanical states.

In quantum mechanics, Heisenberg's uncertainty principle, for certain ''conjugate'' pairs of measurable quantities (examples are position and momentum or energy and time), requires that the product of the uncertainties of the two quantities can never be less than an irreducible minimum value given by Planck's constant divided by two π. If we try to measure the position of an electron with extreme precision, for example, we find that this can only be done at the expense of the measured momentum of the same electron, which becomes very uncertain as a result of the position measurement.

There is also another way in which measurements are limited by quantum mechanics. It's called *Zitterbewegung* or zero-point motion. Imagine a classical (i.e., non-quantum-mechanical) system that can oscillate, for example a pendulum that is swinging back and forth. The pendulum can have large swings with lots of energy or small swings for less energy. But the pendulum has a minimum energy of zero when the swinging stops and the weight hangs straight down.

The quantum mechanical equivalent of the oscillating pendulum has an important difference at zero energy. It cannot swing just any old way it wants. Instead it is allowed to swing only in certain "states" or modes of swinging. The swing or oscillation modes are quantized, and the energy of the system can be changed only in quantum jumps that take the quantum pendulum system from one oscillation mode to another. For our purposes the really interesting aspect of the quantum oscillator is that *it cannot stop*. Its lowest allowed energy state does not correspond to zero energy, but to half the energy gap to the next allowed state. So even the zero-energy system can never be at rest. Even when all possible energy is removed, it remains in a state called zero-point motion, the motion that it retains when all removable energy is gone.

In a more complex quantum system containing many semi-independent quantum oscillators, the zero-point motion represents a quantum noise that is superimposed on any measurement of the system. If an attempt is made to cool the system by removing the heat energy, the zero-point motion represents a rock bottom, a limit below which straightforward cooling cannot go.

There is a trick, however, for making the system colder. In quantum mechanics the energy and the frequency of a quantum oscillator system are interchangeable, differing only by a constant multiplier. Further, in the context of Heisenberg's uncertainty principle, the conjugate variable to the frequency is the *phase*, in other words, the starting angle for an individual quantum oscillation. Phase is difficult to measure and is usually ignored in characterizing complex quantum systems. However, it has its uses. Recently it has been realized that in many quantum systems the limits to measurement precision imposed by zero-point motion can be breached by converting frequency noise into phase noise, keeping the product within the limits dictated by the uncertainty principle while reducing the variations in frequency (and therefore energy). If this technique is applied to a light beam, the result is called "squeezed light." Recent work in quantum optics using squeezed light has demonstrated that old measurement noise limits considered unbreachable can now be surpassed with ease.

The squeezing effect investigated by Hochberg and Kephart, however, was not for light but for the vacuum itself. The theory of quantum electrodynamics tells us that the vacuum, (i.e., empty space) when examined on very small distance scales is not empty at all; it seethes with a kind of fireworks called vacuum fluctuations. Pairs of "virtual" (energy non-conserving) particles of many kinds continually wink into existence, live briefly on the energy credit extended by Heisenberg's uncertainty principle, and then annihilate and vanish when the bill for their energy debts falls due a few picoseconds or femtoseconds later. These vacuum fluctuations can be squeezed in the same way that light beams or systems of atoms can be squeezed, and the result is a vacuum that has an energy less than zero. In other words, a region of negative energy of just the kind needed for wormhole stabilization.

Hochberg and Kephart used a technique of general relativity called a Rindler transformation to show that over a period of time the vacuum in the presence of a gravitational field is squeezed. They found that near compact gravitational objects like black holes, substantial squeezing of vacuum fluctuations occurs at all wavelengths greater than about the Schwarzschild radius of the object.

For a solar-mass black hole, such as what might be found somewhere in our Galaxy, this squeeze effect is not very interesting because only wavelengths greater than 5 km (long wavelength radio waves) are affected. However, the early stages of the Big Bang created a very large number of quantum black holes with masses corresponding to the Planck mass (about 10^{-8} kg). Near such quantum black holes, all wavelengths greater than the Planck length (about 10^{-33} cm) would be squeezed, in other words, all wavelengths of interest for vacuum fluctuations. This creates a significant zone of negative energy of just the kind that might stabilize a small wormhole.

There are two important consequences of these results of Hochberg and Kephart. First, in the TMY work on lorentzian wormholes it was found necessary to violate the "weak energy condition." The weak energy condition does not have the status of a physical law, but it is a condition that holds in normal situations. There were speculations that its violation might be in conflict with quantum gravity, making stable lorentzian wormholes impossible. This is apparently incorrect. Hochberg and Kephart have now demonstrated that the natural and inevitable squeezing of the vacuum as it evolves in a strong gravitational field is in violation of the weak energy condition. This places the TMY work on a more secure foundation.

But from the point of view of SF, there is another consequence of squeezed vacuum that is more important. It appears that in the early universe, and perhaps in other energy-rich environments, the conditions are right for producing natural self-stabilizing wormholes (without the need to invoke TMY's advanced civilization to create them). Such wormholes, created in the Big Bang during the inflationary phase and afterwards, might be around today, spanning small or vast distances in space and waiting only to be found and expanded to a usable size. They might even connect one bubble-universe with another from which it is otherwise completely isolated.

Further, if such wormhole remnants of the Big Bang do exist, it is unlikely that the two separated ends of the wormhole could have had exactly the same history of velocity, acceleration, and relativistic time dilation, and so there will almost inevitably be a difference in the positions in time as well as in space for the two wormhole portals. Therefore, if such natural wormholes with their portal ends not too far apart could be found and expanded, they could be used for time travel.

Of course, as we say when writing funding proposals in science, more work needs to be done. The detailed stability and time evolution of small wormholes formed in the negative energy zone of a quantum black hole needs to be intensively investigated. Nevertheless, with the work of Hochberg and Kephart we have a plausible scenario for naturally occurring wormholes that can provide FTL travel and time travel that can be used in a thousand SF stories. For the purposes of SF, that's all we need. ■

References

Wormholes, FTL, & Time Machines;
Michael S. Morris, Kip S. Thorne, and Ulvi Yurtsever, *Physical Review Letters 61*, 1446 (1988);
Michael S. Morris and Kip S. Thorne, *American Journal of Physics 56, 395 (1988).*

Wormholes and Squeezed Vacuum:
David Hochberg and Thomas W. Kephart, *Physics Letters B 268*, 377 (1991).

●There are only two ways of telling the complete truth—anonymously and posthumously.

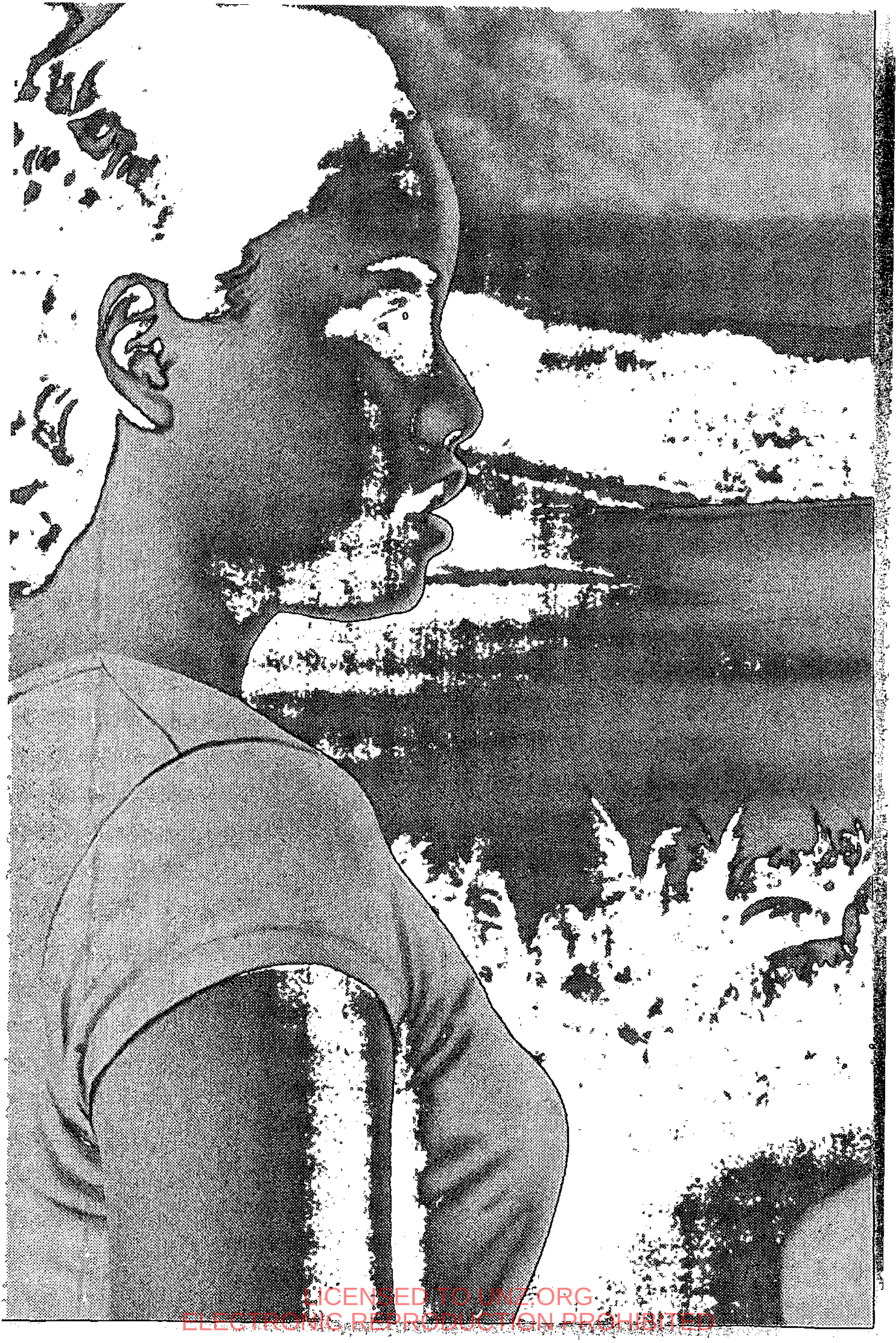
Thomas Sewell

●What an author likes to write most is his signature on the back of a check.

Brendan Francis

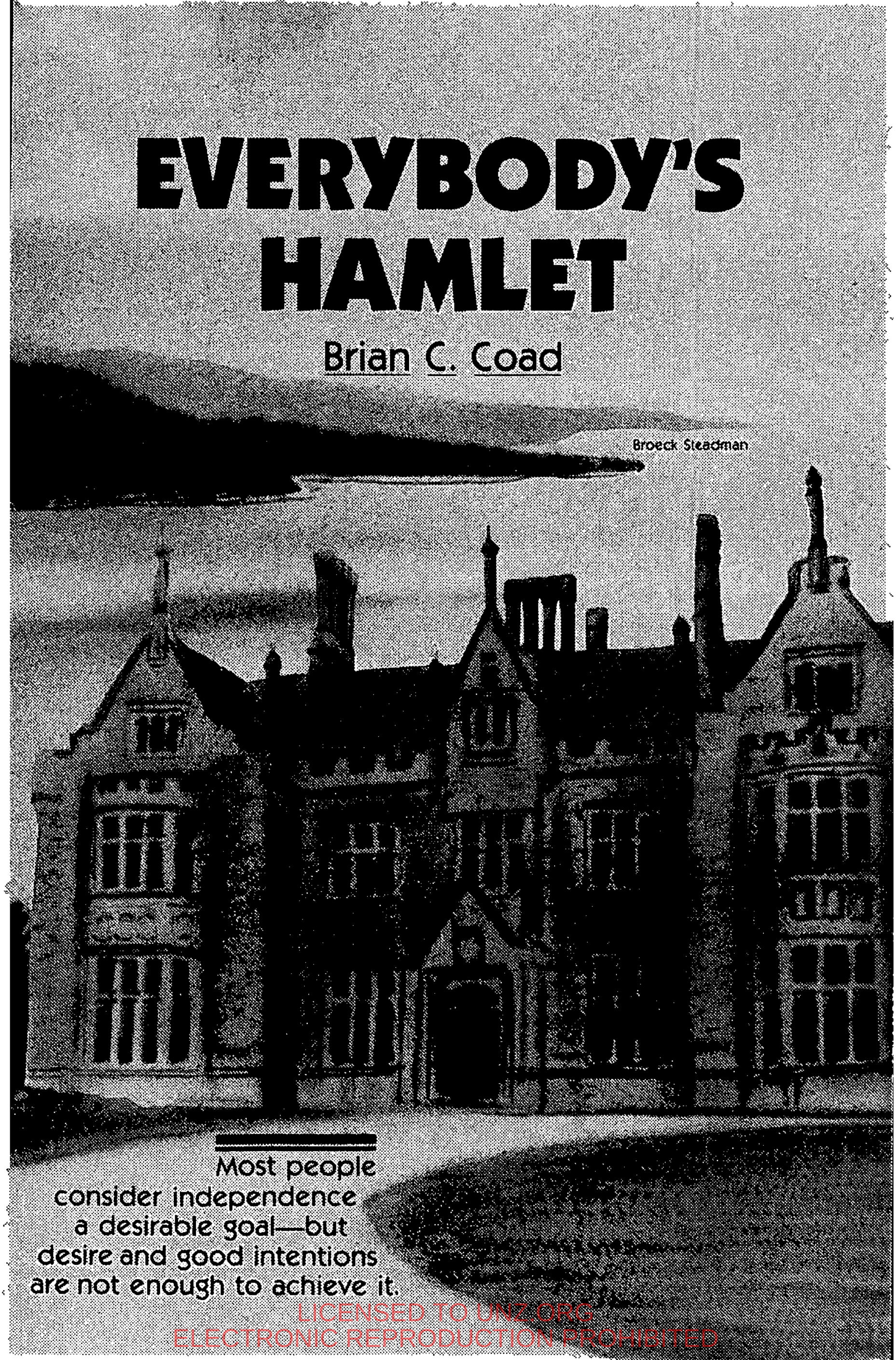
●It is much more difficult to judge oneself than to judge others.

Antoine de Saint-Exupéry



EVERYBODY'S HAMLET

Brian C. Coad



Broeck Steadman

Most people consider independence a desirable goal—but desire and good intentions are not enough to achieve it.

On a February afternoon, an aircraft bore me southwards across a snow-blanketed America, carried me above grey ocean, and let me down over ultramarine waves tinted delicately purple, to a smooth landing on the island of Jamaica. There, at Kingston's Norman Manley airport, I, with the rest of its cargo of passengers, including Boyd Jenkel, was let out into the sunshine and warmth.

Boyd Jenkel, who'd invited me *ex officio* as G.B.I.'s corporate patent attorney, down to this island to attend a seminar he'd arranged for G.B.I.'s senior technical people, had brought with him a number of his bean counter cronies to help him educate us. Neither he nor they were my kind of people. Fortunately seats on the flight had been preassigned, and Ms. Lee, my competent secretary, had seen to it that, on the journey, I'd not have to sit next to any of them.

The year was 1982, which is a long time ago. The recession which began the first Reagan administration was in progress. Boyd Jenkel was an expert in creative financing, an art, or craft, of which we were beginning to hear a lot, and heard more throughout the eighties. He'd convened the Jamaica seminar (actually, seminars—there were several of them, each for a different category of G.B.I. personnel) to indoctrinate senior personnel in his skills. Truthfully I wasn't much interested in financial manipulations, but Ms. Lee had urged me to accept his invitation. Anyone who suggests I'm particularly cranky in the cold months of winter is slandering me. I think, for reasons of her own, she simply wanted me out of the office for a few days. A blizzard was forecast to hit Connecticut in twenty-four hours, but that had nothing to do with my decision to go to Jamaica. I merely resolved, despite personal inconvenience, to discharge an unpleasant duty Mother Company had laid on me.

About Boyd Jenkel. "Wonder" Boyd. A small man with a big voice. He was, if I may mix metaphors, a loose cannon on the corporate chess-board, a sort of rogue queen. Scion of a family that owned a lot of G.B.I. shares, he'd risen to become president of Electronics Division, where he'd achieved high visibility and generated a torrential flow of cash. Like many non-technical people in high office, he'd had difficulties with his engineering staff, who, in sardonic mood, had bestowed upon him the "Wonder" appellation. Unluckily for him, his acquisition of the title was regarded as a serious matter by the Six Hard Men who comprise our executive committee. Some of them truly believed they had a wonder on their hands. Such rogue queen persons receive extraordinary attention from kings, whose jobs they threaten. Typically, the kings promote them to some new office where they are so encumbered by pawns and lesser pieces, they are rendered innocuous.

That's what happened to Jenkel. The Six gave him a group vice presidency, removed him from Electronics, and put him in charge of our corporate cash cows—Steel Division at the time being his prime beast.

Herding cash cows is a thankless task. The herdsman is expected to savagely milk them of cash, until they expire from malnutrition. Then he must persuade the critical Six that their demise has not resulted from his mismanagement. Thus Jenkel was reduced to an individual with not much of a future. I gave him high marks for craftiness. He assumed his new duties, but quickly transformed himself from queen into knight. With a clever sideways leap, he obtained permission from the Six (who had the recession blues) to conduct financial seminars for the whole corporation. Faced with the problems of the times, the Six accepted his argument that his seminars would prove to be a magical key to corporate survival.

How come he chose to perform his magic in Jamaica? There is no truth in the grapevine rumor that it's corporate policy in bad times to reassure people by pampering them, while in good times they do the opposite. G.B.I. owns, in the foothills of the Blue Mountains above Kingston, a country club normally used to entertain senators, top Department of Defence officials, and such. It wasn't being used just then. Boyd merely calculated, taking motels and so forth into account, it would be cheaper to propagandize us there than at corporate headquarters or elsewhere on the American mainland.

Such, then, was "Wonder" Boyd Jenkel, who, with his accomplices, I saw entering the airport concourse just ahead of me. In the baggage area, I couldn't avoid catching up with them. I nodded to a few with whom I was acquainted, including Jenkel. He failed to acknowledge my salutation. We collected our baggage, passed through a cursory customs inspection, and, myself hanging behind again, went out to the street.

Outside the airport, a small army of bare-chested Jamaicans in beachcomber cut-offs competed to carry our luggage, call us a taxi, "show you de nightlife of Kingston, mon." From a reasonable distance, I was able to observe Jenkel in his role of a leader of men, marshal his subordinates, drive off the job hustlers, and provide general organization.

Official transportation from the club was supposed to be waiting for us, but there was no sign of it among the taxis and the private vehicles congesting the dusty street. There was plenty of time for me to observe the Mother Mary blue of the sky, the tall coconut palms in the parking lot across the way swaying in a mellow breeze, the glowing red patches of hibiscus and poinsettia surrounding their spindly stems. Numerous supple girls in tropical silks, escorted by young men in white flannels, came and went from the airport. Twenty yards along the sidewalk, steel drummers tinkled island music. There was in the air a fragrance of exotic adventure. I commended myself on my devotion to duty, and congratulated myself for coming here.

A small audience had gathered around the drummers. One of them stood out, taller than the rest, and better dressed. It was my old friend, George Oliphant, chief metallurgist of Steel Div. I decided his company would be much preferable to that of the Jenkel mob. I picked up my bag and went along the sidewalk to greet him.

Truthfully, I was hoping George would turn up at the seminar. Liberty George, the Model Man. That was what I called him in the notes I keep, in a private cabinet, on interesting company people who might inspire one of my stories. He was by birth Jamaican, and would be an ideal guide to show me the sights of the island, should the seminar leave us with free time. I'd long counted him a friend, though he wasn't an inventor. He'd a highly creative, if wild and undisciplined, intelligence. On many evenings over the years, when I was stuck in Indiana overnight after doing business with Steel Div., he'd entertain me over a few beers with his undergraduate style discussions of the human condition. His two favorite topics were human freedom, and human models of reality. Unfortunately, I'd never been able to get him to apply his engineer's discipline to his wilder thinking, nor to apply that creative side of himself to his metallurgical interests. He simply refused to produce anything patentably original, stating it wasn't part of his personal model to do so. I told him frequently he'd been brain-washed by inferior mentors with models cast in concrete, who didn't want to be bothered by changes, into thinking everything was done already that could be done. My arguments carried no weight with him. Nonetheless, he was a highly competent engineer, one of that band of brothers and sisters who enable the rest of us to believe the industrial processes which keep us alive, run themselves, without sacrifice of human blood, toil and tears. His sense of responsibility, and the "minor" improvements he'd put in place over the years, had netted G.B.I. millions of dollars. I respected him particularly for winning his job over white competition in times long before the civil rights movement made equal opportunity employers of us all.

As soon as I was clear of the crowd at the concourse entrance, George saw me coming. He advanced towards me, hand extended. There was luggage in his other hand, so I imagined he'd also just arrived. From Chicago, presumably. Steel Div. is just over the Illinois border. "Good to see you, George," I said, shaking his hand. "How's your personal model? You glad to be home out of the cold?"

"Sure am, Wally. Though I can't exactly call this place home. Been away too long." George normally talks with a neutral accent that has a bit of British in it if you listen closely, but here, on his own ground, I detected a trace of an island lilt. "As for my model, it's pretty bleak. A lot depends on who that little guy over there is. The one that's pushing people around. Is that Boyd Jenkel?"

"Steel Div.'s new master. You haven't met him?"

"Nope. Must be three months since he took over. He's been issuing orders, cutting my staff, things like that, but he's not been out to see us yet."

"Odd. That individual is, indeed, 'Wonder' Boyd."

"You sound like you don't like him much either. Suppose we take a little walk in the opposite direction."

"He been giving you serious trouble?" I fell in beside George. We walked towards oncoming traffic. Behind us the steel drums continued their trills.

"Yeah. Messing up all of my models, not just the personal one. Plus he's seriously curtailing human freedom. I had to let go four of my people. My guess is he's on the way to closing down

Steel. He's going to put out on the street my good friends there. People too old to learn new trades, who've devoted their lives to G.B.I."

"He won't do that. It's too soon after he took over. Bad for his image. But I will admit he's not my kind of fellow."

George shrugged. "Suppose I'll just have to put up with him."

A VW bus chugged by. Over my shoulder, I saw it pull up by the G.B.I. people. The official transportation, evidently. Boyd bustled around his folk like a sheepdog, herding them into it. I turned George around, intending to pilot him to the bus. George shook my hand off, and brought us to a stop. "No need for us to suffer crowding. Ed'ina's going to pick us up. Niece of mine."

Boyd supervised a number of the beachcomber-porters, who packed luggage into the back of the bus. One of them clumsily dropped a bag. If we'd been twice as far away I'd have heard Boyd bawl him out. "Little man has a big voice," George said. Boyd cuffed the young fellow, a well-muscled lad no more than seventeen. The lad tensed, muscles rippling, and I thought he was going to hit back. With a great effort, he managed to control himself. Boyd, directing others, ignored him, probably noticed nothing amiss. Presently the lad picked up the bag he'd dropped, and went on with his work.

A moment later the bus was loaded and, Boyd not even waving at me to check whether I needed a ride, it was on its way. In the smoke of its exhaust, the chastised lad stroked his face and glared after it. George said nothing, but his lip, too, twitched angrily.

Close by, a car horn hooted, one of those old fashioned ones that play "Tally Ho!" A battered blue Thunderbird with monstrous tail fins came to a halt beside us. Driving it was a girl, twenty-fourish, with bare brown shoulders and sultry eyes, precisely the sort of maiden I'd in my bleak Connecticut office fantasized would be waiting to pick me up on this romantic tropical isle.

George made an introduction, adapting island speech. "Wally Mason. This be my niece, Ed'ina."

With an aristocratic graciousness that delighted me, Ed'ina proferred to me through the open window of the car a small hand. I took it, and could not resist bestowing upon it a gallant butterfly kiss.

Ed'ina chuckled, then in a musically husky voice invited me to get into the back seat of the car, with the luggage, if I wouldn't mind, while dear Uncle George could sit up front. I piled into the vehicle, with George's bag and my own. George went to the street side of the car, and climbed in. He pecked Ed'ina's presented cheek, called her his pretty little pigtails (though her hair at present was fashionably waved in a modern style). Evidently a long time had elapsed since they'd seen each other. George said: "You've done the best job of growing up of anybody in our family."

Ed'ina, as she set the car in motion, said: "You ain't done no growing no how, Uncle George, off there in America. You come back just like I remember you." Then she glanced up at the rearview mirror, was reminded of my presence, and brought me into the conversation. "How come you keep my

Uncle George all this time in America?"

"We needed him. Couldn't live without him, I guess."

"We need him, too. Been some changes since you been gone, Uncle. What is it, fifteen, twenty years?"

"Something like that."

"I *was* a little pigtail back then, wasn't I? Why you not come visit us? All other Americans come here to this island."

"Yeah," said George. "Like that one—you see him?—hit the porter."

"They think we still slaves. Don' never hear of their Mr. Lincoln's proclamation," said Ed'ina. She caught sight of me again in the mirror. "Some of them—I don' mean you, Mr. Mason."

"It's evident you don't like Americans very much, Ms. Oliphant. If I get a chance, I hope I'll be able to change your view of us."

"Hope you can, Mr. Mason. You right, I a bad girl, think ever'body just alike. But see all this"—we were passing through downtown Kingston, a region of broad avenues and tall office buildings, not quite Hartford or Cleveland yet, but on its way there—"all yankee-town, own half island, make us just like them. What I don' like, they not happy. Them mouth corners all turn down. Even when they smile. That why they be bad-tempered, hit porters. They be here long enough, they make all us like that."

"Maybe that's why I haven't been home for so long," George said, relinquishing the island persona he'd assumed. "Maybe I just wanted in my memory the fantasy Jamaica of expanding freedom that existed when I was a child. Didn't want to see the changes."

"We'd just got free when you went," said Ed'ina. "Now we a colony again."

"The world monoculture. It is embedding everyone in its rigid grip." Speaking now was the mildly pedantic Liberty George with whom I was familiar. I'd often heard him complain of the advancing world monoculture, everybody everywhere all alike, in his opinion (he'd have said his model) ran against the trend of Nature, which is always towards diversification. He turned to look at me. "My brother—Ed'ina's father—wrote to tell me he's been buying up coffee farms in the Blue Mountains with leveraged buy-outs. That's how bad it's got. You getting rich, Ed'ina? What will you do when you're rich?"

Ed'ina shrugged her pretty shoulders. "I don' know. Ain't no place to go, nothin' to do anymore."

We were climbing now, though still on a city street. I caught a glimpse of a street sign, and saw we were on Old Hope Road, which wound through a more ancient part of the city. There were more pedestrians here, many of them dressed in rags, and a number of muddy featured children dressed in not much at all. This was the third world Jamaica, the Jamaica of dire poverty. I thought I could see why the cuffed lad had shown restraint with Jenkel. Between dilapidated grey buildings, I caught occasional glimpses of the Blue Mountains, actually blue, in the hazy distance.

"Mr. Jenkel and I will probably not get along well," George said, turning toward me. "One can hardly forgive an individual who perpetrates physical violence. His model and mine would seem to be incompatible."

"You probably won't see much of him." I tried to sound reassuring. "He's strictly nontechnical, won't interfere with you. And has to depend on you. The nontechnicals always have to depend on their engineers."

"*Their* engineers. There you go, Wally. As if they own us. What sort of world will it be when the monoculture is everywhere, and we're all of us owned by nontechnical Jenkels?"

I refrained from reminding George he'd had to let go *his* people.

We were clear of the city, rising fast now, and there was much to see. The Thunderbird, feeling its age, was making rather heavy work of it. George turned to Ed'ina, and began discussing family matters. I examined the rolling mountains, looked back over the city and the bay, and, exercising a faculty universally possessed by lawyers, closed my ears to their conversation.

It took only fifteen minutes or so to get to the G.B.I. country club, which, perched like a castle on a high spur of land, had been in sight for the last ten. A grim wall, broken by an open wrought iron gate, surrounded the base of the spur. We went through the gate, and climbed on a spiral dirt road through a forest of exotic trees—breadfruit and such, I judged, from the large peculiar fruit hanging among their branches—to an open space at the top. Up there, an asphalted parking lot scarred a smooth rolling lawn. On it I noted, among other vehicles, the VW bus that had fetched the Connecticut cohort. Over the lawn towered a great Georgian mansion that might have been transported whole from England. It was a huge square palace, with ornate chimney stacks and, I'd judge, three or four hundred windows. A fine, solid relic of Empire.

Ed'ina drove up to the front entrance, a covered and columned porch constructed to shield the gentry from the elements as they disembarked from their coaches. George and I got out of the car, and I brought out our bags. Ed'ina said: "I see you this evening," and drove off. My face must have had a question on it. George said: "Ed'ina works here." He took his bag from me. I followed him. At the entrance to the building, there was a hanging rope which, when he pulled it, set a bell reverberating hollowly within. The massive double doors opened, and a flunky in a seventeenth-century crimson uniform bowed us inside.

That evening we dined formally in the great hall of the club. When I say formally, though Boyd Jenkel himself wore a tuxedo, I don't mean we dressed for dinner. It would have been beyond the powers of even the Wonder to get a group of engineers to wear monkey suits. The formality was in the great oak tables, exotically beflowered with arrangements of orchids, bird of paradise lillies and such, and laden with silver and cut glass vessels containing interesting and exotic fruits and wines. It was in the spread of cutlery on either side of each diner, and the dignified waiters with their tail coats and starched shirtfronts. It was in the hall itself, with its panelled walls and high blue ceiling populated by rosy-cheeked cherubim.

There was a head table, raised slightly above the others, at the center of which sat "Wonder" Boyd. His cronies were placed to the right and left of him, and next to them G.B.I.'s most senior engineering staff. My seat was on the fringe of the right hand bunch of cronies. Stretching like arms from the head table, small access gaps between them, were the tables of the more ordinary folk, among whom I'd have preferred to be. Most of my best inventors were down there. At least I'd found time earlier to go around and greet several of them. Everyone looked inwards to a large central space where the waiters performed their duties. Theatrical curtains on the far wall concealed, I presumed, a stage. I saw George Oliphant sitting a good way down at a lower table on my right. Altogether there were close to a hundred of us in the hall.

We ate callaloo soup, salt fish and ackee, jerk pork, and a variety of plantain/banana auxiliaries that were particularly delicious. French and Californian wines flowed freely, though many of our numbers preferred to stick to the local Red Stripe beer. There were fresh mangoes, guava jelly, beheaded green coconuts which served as goblets for their own milk. Finally, as the waiters bustled around clearing the tables, Tia Maria and Rumona liqueurs.

At that point, "Wonder" Boyd felt moved to address us. He stood, rattled a spoon in a glass. The buzz of conversation died. It had never been more than a buzz. At such corporate gatherings, Mother Company looms over the proceedings like muffling fog, and ensures the atmosphere is subdued.

Boyd spoke. Loud. "On behalf of G.B.I. I bid you all welcome to Kingston, ladies and gentlemen." (There were a few female engineers among us—not nearly enough.) "We are not here to enjoy ourselves, we're here to learn a lot of things I'm sure many of us don't know anything about. How to make money, and how to make money go further." There was a slight quaver in his voice. I guessed being in the presence of so many technical people with skills of which he knew nothing made him nervous. "I'm sure you'll all work hard, and if there's a little pleasure comes up along the way, so be it. Our great corporation, G.B.I., has graciously provided entertainment for us. Let's see what it is."

To muted applause (again, Mother Company tolerates no excessive displays of enthusiasm) he sat down.

The curtain at the far end of the hall opened, revealing a stage, on one side of which a substantial orchestra sat on rising benches. On the other side stood a choir of young women, twenty or thirty strong, in tasteful evening gowns. Scantily clad maidens is another thing Mother Company won't tolerate.

When the curtains were fully opened, the whole stage cranked forward, until it occupied a good part, perhaps a quarter, of the space enclosed by the tables. A graceful figure advanced from behind the orchestra. I recognized George's niece, Ed'ina, a tiara'd princess in an emerald velvet gown that set off wonderfully her smooth brown shoulders and pretty face. With practiced stage presence, she took a central position. The orchestra, in tones embodying a trace of calypso blended with a good deal of mariachi, struck up the good old American song: "This Land Is Your Land." Ed'ina sang. I had heard music in her voice when she first spoke to me. Her singing was rich and powerful, beautifully supported by orchestra and choir.

Gradually the calypso-mariachi idiom grew to dominate, and new words came out, to the effect that this particular island where we now were also belonged to you and me. A sort of "*mi casa es su casa*" note of welcome. The song did not end, but merged into ever more island themes, until Ed'ina was working through a whole Johnny Mathis repertoire. Whoever arranged the music had done a fine job.

Eventually the set came to an end. To applause loud enough to generate frowns on Mother Company's forehead, should she choose to make herself visible as she hovered over us, the stage retracted, and the curtain fell. By this time our engineers, influenced by free-flowing liqueurs and Red Stripe beer, in defiance of custom, had begun to loosen up. I thought I smelled a hint of ganja in the air. A few of them may have sampled the famous Jamaican mushroom tea brewed from psylocybin mushrooms. Who knows?

The applause faded, but not the noise. There's considerable rivalry between engineers from our different divisions. Raucous repartee began flashing between the tables. Aerospace people attempted to start a bread fight with Electronics, opposite them across the central space. Fortunately the latter did not rise to the challenge. Then the curtains opened again, and the stage moved out, not as far as before. Ed'ina, still in her velvet gown, was already in her central position, the orchestra behind her. "Now folks, let's have some fun! Let's all limbo dance." Backed by the orchestra, she began with a song that told us what limbo was—"Get down low and then lie back. Under the stick—" Meanwhile into the open space between the tables filed the young ladies who'd comprised the former chorus, now dressed in multicolored jeans and smocks more suited than evening gowns to this change of pace. Ed'ina went on to a more familiar limbo song, and they gave us a fine demonstration of the limbo art. Then they went around to the audience, asking for volunteers to join them. Nothing loath, many of our engineers came forward, some of them staggering. They entered with clumsy vigor into the spirit of the evening. I began to worry about spinal dislocations, and G.B.I.'s insurance exposure.

Two or three of the girls invited "Wonder" Boyd out, but he shook his head, and raised his glass in a toast to the performers and to Ed'ina. For some reason, I received no invitations from the dancing girls.

There was considerable chaos on the floor. Ed'ina came down from the stage, bringing order into the festivities. She organized a competition between teams from the different divisions. The limbo sticks got lower and lower, and when only Electronics and Aerospace were left, she declared a tie. Both groups good-humoredly protested, and she said, well, they'd have to sort out the winner among themselves, and there was a great shouting match, and a good time was had by all.

Someone reminded us in slurred tones that Boyd Jenkel had declined the opportunity to demonstrate his limbo skills. There was a clamor for him to come out now, and show what high ranking management could do. The engineers still on the floor returned to their tables. The girls with the limbo sticks, but for one pair, exited back of the stage. Ed'ina waved a delicate come-hither invitation towards the Wonder. Boyd, I thought struggling to suppress feelings of embarrassment, came out from behind the head table. The orchestra welcomed him with a drum roll, then began again with the "Jack Be Nimble" tune. Ed'ina, singing, advanced to welcome Boyd. She escorted him to the center of the space, positioned him to begin his progress towards the limbo stick.

Boyd lost his nerve. Instead of getting himself into motion, he grabbed Ed'ina's arm, yelled over the music: "Why don't you do it? I'm sure you can do it much better than me. Right, guys?"

Ed'ina stopped singing. She attempted to shake off Boyd's grip on her. "I am star here. I am not dancing girl." Her dark eyes flashed fire.

Her response angered Boyd. "Oh, yes, you are. If I say dance, you dance. Understand?" He twisted her round and pushed her towards the limbo stick. In a half-hearted way, the orchestra continued to play.

Ed'ina stamped her foot. "I do not dance!" Boyd twisted her arm. Her shoulders quivered. She bit her lip in obvious pain.

George Oliphant, who'd not participated in the earlier frolicking, dashed across to Boyd, grabbed him, yelled: "You damn well let go of my niece!" Boyd Jenkel, unprepared for this assault by a much larger man, let go of the girl, struggled to maintain his balance, slipped, and landed with an audible "plonk" on the floor. He gazed around foolishly.

Ed'ina retired to the stage, and stood there looking down. Slowly, gingerly, small Boyd picked himself up. He glared at George, licked his lips, glanced around the tables, and said: "I think we'd better go on to something a bit more in keeping with dignified professional standards." Drawing himself up to his full five-six, he marched back to his place at the high table. George watched his progress, shrugged, returned to his own seat. The audience? Mother Company's grip on them was too firm to permit them to react openly, but I thought I detected suppressed sniggers coming from many of them.

Ed'ina spoke down the length of the hall, addressing Boyd. "I have a very special song which I dedicate to you, Mr. Boss-man." She nodded to the orchestra, which played an introduction. I got from George later a copy of the words she sang:

Little green island in deep blue sea,
All you done want is just be free.
Spanish men come, they want to eat you.
You boil them up in rice'n bean stew.

Over the deep sea come buccaneers
A-swashin' them buckles and causin' great fears.
To old Port Royal you give a great shake,

Feed 'em to the fishes, and now they fishy cake.

More white man come, and come again,
A-plantin' up your fields with sugar cane.
Your big winds blow, and they couldn't stay.
You drown them all in Wickie Wackie Bay.

Now here we are and here we be,
Infested with tourists, as you can see.
What we goin' do? Ain't no room for us.
Send them all back home in a omnibus.

We don' want to be no colony.
All we done want is just to be free.

When she finished no one knew quite what to do. Someone yelled: "Hey, we ain't tourists," and applause was suddenly in order, but it was restrained. What there was of it, Ed'ina acknowledged gracefully. Boyd Jenkel stood up. He addressed Ed'ina. "Thank you for your entertainment. I shall certainly mention your performance at G.B.I. headquarters. Perhaps I should now ask you to sing "Rule Brittannia," to bring back memories of old colonial times? No? You don't want to be reminded of your days of captivity, before Uncle Sam brought you freedom? Very well." He turned to the rest of us. "I think our bedtime has arrived, ladies and gentlemen. We have a great deal to do on the morrow."

"Wonder" Boyd stalked out of the room.

Thus the party ended.

* * *

I'm an early riser, but next morning I was no further advanced with my toilet than the shaving stage, when there was a knock at my door. I left the bathroom, crossed the enormous bedroom with which I'd been favored, opened the door, and there was George Oliphant. "How'd you like to go for a drive before breakfast, Wally?"

"Come in," I said. "Give me five minutes to finish getting my face spruced up, and I'll be with you."

George settled into a chair in the huge bay window from which, on the previous afternoon, I'd enjoyed a view of half of Jamaica. Apart from the fact that it was not yet daylight, there would have been no view today. Heavy tropical rain splattered against the window panes.

I left George to extract what pleasure he could from the rain and the dark, returned to the bathroom, examined my soaped up clown's face in the mirror, picked up my razor, went to work on my chin, and wondered what advice I should give him—I presumed, after last night's little fracas, he'd come for advice—that would best serve Mother Company.

Presently I was ready. We went along corridors and downstairs to the front door. Outside, George had Ed'ina's blue Thunderbird parked beneath the pillared entryway. I got into it, George took the driver's seat. We drove off. As we headed, in a vision-obliterating downpour, down the spiral road toward Kingston, George, who on the way to the car had had nothing to say, said: "A perfect day. Matches my mood exactly."

"Not the best of days to view the

scenery."

"It'll be better when we get out west. Maybe my humor'll improve. Rain stays mostly on the mountain."

We rolled on silently for a while, then I said: "I'm sorry for what happened last night."

"Me, too. Not your fault, Wally. You've no need to apologize. I shouldn't have got angry."

"Jenkel was definitely in the wrong. Your action was justified."

"That doesn't count, does it? His is the kingdom, the power, and the glory. I'm just a hired flunky."

"That's ridiculous. Steel Div. couldn't function without you. The Wonder is well aware of that."

"Just so, Wally. Unfortunately, in his personal model, he plays the role of God. He knows he lacks the omnipotence for which the part calls. His is a classic example of a model polluted by flaws which its constructor can neither ignore nor accept. Thus he is obliged to play dictator, and push everyone around."

"Yeah, I suppose it's a bit like that. A bit like that for all of us when we get out of our depth. Human nature. Fake it, and if you can't fake it, throw your weight around. But what else are poor humans to do?"

"I am not truly concerned for Jenkel's problems. I am concerned for Jamaica. For its recolonization by individuals like him."

"The spread of what you call the monoculture."

"Yes." George fell silent again.

We were by now beyond the wall around the club, and emerging onto Kingston streets. He drove much faster than I would have done under conditions of poor visibility. I elected to let him stay quiet and concentrate on his driving. To keep my mind off the peril I was in, I forced my thoughts to rove back through time, and see if I couldn't bring a little order into the flow of ideas I'd heard from him over the years. Bear in mind he was a scatterbrain, and what follows came to me, on occasions when I'd had reason to visit Steel Div., and had spare time for a beer with him at day's end, in dribs and drabs.

George reckoned we humans can't connect with reality, we're too dumb. "Reality's infinite. The reality of every single item in the Universe, from a quasar to an electron to what you feel as you put on your pants in the morning, is infinite. Not to mention every item that exists outside the Universe. Speaking of which, compared with everything, the Big Bang itself was no more than the bursting of a boil on Reality's buttock. How can poor little us deal with infinite reality?"

Well, we can, George reckoned. Reality, whatever it is, likes to have models made of itself, more or less analogs of whatever it is. We've been endowed with a faculty for constructing such models, and that's what we are, all that we are, creatures that make models of reality. So far we've made them well enough to manage to survive.

"What a person is," said George, "is an integration of three models. The one that comprises the culture in which he lives. His own personal one, that he invents for himself. The biochemical model that's hardwired into him by Nature." (When I heard that, I remember murmuring: "Superego, ego, id." He said: "Father, Son and Holy Ghost. There's lots of models of my model.") "The hard-wired one's developed over millions of years. The cultural one, over a few centuries, the personal one, you've only one lifetime to develop. How well you integrate the three, plus, particularly, what your cultural model is, determines whether you're a high energy, creative, happy individual, or a morose, despondent nonentity.

"When your personal model conflicts with the cultural model, either you come out in protests, or you come out in spots and other psychosomatic symptoms." This was in the late sixties, early seventies, the period of the Vietnam war. The war made George angry, but I guess he was the type that came out in spots. He was never an activist. At the time I thought, and still thought riding in Ed'ina's car that day in Kingston, a shrink would have labeled him passive-aggressive.

Earlier in the sixties, when hippies came on the scene, George reckoned Einstein was responsible for their appearance. "His model of gravity. Every body creates its own space, and falls into it. Hence, flower children." His ideas, if nothing else, kept me amused. Later, on the Watergate affair. "Magna Carta all over again, Wally. A reaffirmation that the King must live under the Law."

If your three models are reasonably good analogs of reality, George reckoned, and if you can get them working together, you're assured of personal liberty, and you'll have a reasonable sense of immortality. "Everybody needs to feel a bit immortal. It gives you energy and strength of purpose. If you don't have it, you live in despair. You can get your sense of immortality from being a leader with a lot of followers who'll lay down their lives for you, or you can get it from putting your trust in such a leader, who'll take care of you. There's a biochemical thing goes on with leaders, like in dominance struggles in baboon troops or wolf packs. Established dominance suppresses the urge to challenge it. You can't fight City Hall." I recalled the unhappy look on his face when he said that. "Surely the saddest sentence in the American language." But he never himself fought City Hall, as personified by G.B.I. Management.

"You get too strong a feeling of immortality, you self-destruct. Like a Napoleon, or a Hitler."

"Everybody's immortal. Everybody's model ripples into the future, and nobody knows which ripples will augment and become important, and which will be damped out. So each of us alive is equally important."

"Generally, the cultural model's the big problem. It's powerful, the personal model's only you. Most folks go along with their cultural model, and never think about it. That's what a culture is—what you do without thinking about it. Trouble is, every model's flawed. If you internalize your cultural model —your country, drugs, your religion, G.B.I.—to the point where you'd sacrifice your life for it, chances are you will have to, life's hours if not life's blood. But if you don't commit yourself to your cultural model, you miss out on its benefits. A sense of belonging, a feeling of security. You're likely to be split down the middle, with no focus in your life. That's the greatest human dilemma. Go with a model you know's flawed? Or oppose it, and take the consequences?

"Sometimes the cultural model's not much flawed. Then, if everything else is right, and the people feel free enough, you get a great flowering of civilization. There's a lot of geniuses whose names we venerate. But in any small population—say a million or so—there's just as many potential geniuses. Instead of revering individuals, we need to study their cultural model, see what lets them realize their potential. And examine our own culture to see what we're doing that inhibits people's potential. Then change what needs to be changed." A lot of talk from George, but no action.

With respect to the American cultural model, he had a lot to say about money. "American culture assumes money's real, and not a model. It *is* a model, Wally, and a pretty flawed one at that. Money's always anonymous. Has no markers on it to say whether them that accumulate it do anything worthwhile for the rest of us, or don't. Says nothing about human motivation. A whiff of inflation, it disappears. Countries with a lot of it—Spain, England, now, perhaps, America—go down. Them with none—Germany, Japan—come up. The worst thing it does, it forces Americans to be the cruelest people in Western civilization. Yet Americans aren't really like that.

"A better economic model would be based on human time liberated. We have only two things going for us, Wally. Free time, not structured by other people or external and internal compulsions, and the motivation to do something with it. Individuals that liberate more human time than they consume ought to be rewarded. Individuals that consume more than they liberate ought to be discouraged. Praise motivators, and them that demotivate, hang by their necks.

"Primitive folk spend most of their time discussing their cultural model. Testing it against reality. Modifying it if necessary. We delegate that task. In theory to elected representatives. In practice, since the founding fathers opted for a checked and balanced government, to unelected characters—lawyers, financiers, media people and such." (There in the car, I thought, Boyd Jenkel types and such.) "We better watch out, or they'll impose a model on us we can't live with.

"Anyway, in the end, economics is all biochemistry. People getting the little jabs of neurotransmitters and such that make them feel good. Dopamine, serotonin—I'm no expert on the chemistry of feelings. Doubt anyone is. But our ultimate problem, Wally, yours and mine, is just this. Are we getting our fair share of neurotransmitters?"

I once asked George, what happens to a person's model when he discovers it's only a model? Won't he lose faith in it? "Maybe. More likely, he'll regress to his primitive origins and work damn hard to adjust his model to reality. He'll have a lot of troubles, but I'll take bets he'll end up a liberated person with a good model."

I've left out a lot, probably condensed some of it too much, but there, roughly, is my model of Liberty George. A responsible steel engineer with a head full of odd-ball stuff good for an entertaining hour's conversation over a beer. A good man, a worrying man, but powerless. In the car, I glanced at him sideways, noted the grim expression on his face, his slump-shouldered posture. Not one, I thought, who'd ever change the world.

By this time we were rolling through the drab streets of West Kingston, the part of town tourist guides recommend you don't visit. I looked behind us. Black clouds still roiled on the mountain, visible in developing daylight. Down here, the rain was easing off.

George looked so depressed, I felt I ought to say something to take his mind off his troubles. What I came up with probably wasn't the best thing possible, but it was the best I could do at the time. "You think there's anything you can do for Jamaica, George? Any way to get the model changed?"

George answered evasively. "What I don't want is for Jenkel and people like him to have the power to impose their models. Not on this island. Not back home, on Steel Div." Then he mumbled, to himself rather than to me, "The price of liberty's still eternal vigilance. . . . Thing is, how much of a price should a person pay?"

That had me worried. If he felt strongly enough to do something in the Jamaica rescuing line—out of character though it would be—he might quit Steel Div., to the detriment of Mother Company. He'd, I'd thought, invited me on this trip to be his advisor. Best thing I could do was give him some advice. "This Jamaica business, George. The world at large. You can't do anything about that. Why not concentrate on your real problem, which is, how to make peace with Jenkel so you can get on with your work at Steel?"

He turned toward me, grimaced. "Everything's interconnected, Wally. Surely you've heard me say that before. Models. Liberty. Jamaica. Jenkel. Steel. God. You. Me. The Universe."

"Sure, but—"

He'd looked away from the road, and had now to swerve sharply to miss, barely, an oncoming and rickety truck overloaded with furniture, a couple of goats, and on top of the load cackling hens with flapping wings, tied down by their legs in pairs. I gripped the armrest on the car's door. We'd come clear of the city, into open country.

"Where're you taking me, anyway, George?"

"Cockpit Country. Place where escaped slaves used to hide. I lived there when I was a kid."

"That'll be interesting. Won't it make us late for the start of the seminar?"

"I don't give a damn." George drove the car a bit harder. "It's a waste of time anyway, Wally. This seminar. Every engineer in G.B.I. knows more about creative financing than Boyd Jenkel. Has to, or he can't get his projects approved. Anyway, you know what I think of the money model."

I let the conversation die there. The road, too narrow and none too straight, ran over flat land. Sugar cane fields, I guessed. Fortunately, after the rickety truck, there was little other traffic. George rushed us along at maniacal speed. Conversation, I felt, was definitely not in order.

Presently, where the road bent

sharply, I glimpsed a turnoff with a signpost saying MANDEVILLE, and underneath, REYNOLDS ALUMINUM. George almost missed negotiating the bend. The T-bird's rear end skidded and shrieked. I held tight. But we got around without turning over.

George slowed a bit (not much) and patted the steering wheel. "Sorry, old girl. Forgive me for mistreating you."

"Don't I get an apology, too?"

"Sure, Wally. You. The car. There's no real difference. You're a live life. She's the congealed lives of the people who built her. Isn't that so, baby? You deserve the same respect as Wally, don't you? My apologies to both of you."

Neither the car nor I said anything. Presently George went on: "Pity there's no time to take you out to the bauxite mines at Mandeville, show you where the world's aluminum comes from."

"Maybe some other time. We're here three days."

"Maybe."

He accelerated again. By then the rain was no more than swirling patches of drizzle, between which a few watery rays of early sunshine brought down to Earth some hope.

We came to a new kind of country, a crazy wild place of mystery, such as I'd never seen before. Great chasms yawned beside the road, great pink and white limestone pinnacles like the ghosts of gigantic stalagmites loomed through patchy mists all around us. "This is it," George said. "Cockpit Country."

"What a remarkable place."

"Once a historic cockpit of freedom."

Suddenly the car veered right, turning off the paved road, which, oddly, for the last few miles had been wider and straighter than at first. George forced the congealed-human-lives vehicle he so much respected into a puffing and huffing climb up a twisting and narrow lane. We must have gone up two hundred feet, and then we arrived at a flat place, boulder-strewn and rugged, as the lane had been. In fact, as I quickly observed, we were at the top of one of the pinnacles.

George got out of the car. I followed him. There was a rough wooden rail ahead, designed to prevent an unalert driver from driving over a precipice. George leaned on the rail. I came up and leaned beside him. Below I looked down on a bowl-shaped valley, half misted over, set in the tortured landscape. "That used to be my daddy's farm," George gestured. "Down there he grew tobacco. Down there my grandmother rolled cigars on her thigh to help pay for me to go to school in England."

For a moment the mists cleared, and I saw on the far side of the valley the skeletons of a number of half finished buildings. For some reason I thought of Holiday Inns. "What's happening there now?"

"They're building motels. Asphalted parking lots. There's a fairyland of limestone caves in the hills. A fairyland to me when I was a kid. Now going to be a big tourist attraction. My brother inherited the farm. Sold it to developers. That was the foundation of his wealth."

"You're not pleased with your brother?"

"I've no quarrel with him. It's the

new damn colonialism he's sold out to."

"Jamaica's still a free nation."

"Yeah, but it's rapidly turning back into a colony. Being taken over the way the British did it. You know how they managed to govern their empire with the natives' consent? They sent them pretty trinkets they couldn't make for themselves, and soon couldn't do without. Created jobs for them so they could earn money to pay for the trinkets. Or loaned them money. Pretty soon the natives forsook their own cultural model in favor of a half-assed alien one. Our Jamaican culture's too rich to have that happen again."

"What's so bad about reverting to a colony, if it's American brand?"

"This, Wally. Imperialists come in two flavors, farmers and predators. Farmers at least cultivate their colonies. The British, up till close to the end, were pretty much farmers. Most others have been predators. What I've seen of Americans abroad, there's no reason to suppose they'll mimic the British. The Spanish, more likely. Act like Jenkel, a predator if ever there was one. Predators consume their prey." He spat over the edge of the precipice. "Even if a colony's farmed and not consumed, you won't find anybody writing great literature there, or creating great works of art, or making important scientific discoveries. Their models get too confused. Bottom line, Wally, you can't get your body chemistry in synch, your models integrated, and your energy high if your culture's been suppressed in favor of an alien one. Your liberty's denied."

"How about co-existence? American culture with Jamaican."

"Never happens. There's a rule it can't. Not two cultures on the same plot of ground."

"But America—land of diversity—"

"A myth. A model out of touch with reality, if ever there was one. You'd know it, if you were somebody who used peyote as part of your religion, or who believed in polygamy, or who reckoned the land's only loaned you by the gods, and can't be owned. America's not a diversifier, it's an homogenizer. By and by it'll homogenize the whole world." George looked grim. "And then? What guarantee is there the American culture's the right model of reality to take us into the far future? Hey, Wally, there's got to be diversity. At all costs, there's got to be diversity."

"So what would you propose to do?"

"Find a prophet with a long white beard and blue robe and maybe a shepherd's crook. Have him walk through the wilderness and preach to the people. Maybe get them up here. Tell them they've got to reject all this"—George waved towards the construction in progress down in the valley—"and stand on their own feet. Be poor, if that's what it takes. But stand on their own feet, whatever it costs."

"Well, George, you're no bearded prophet,"—in his neat business suit, with carefully knotted tie, he surely wasn't—"and I doubt you'll find one. Meanwhile, why not concentrate on things you can do something about? Your relationship with Jenkel. The future of Steel Div."

"Any ideas what I can do for Steel?"

"Sure. Just what the prophet would say should be done for this island. Get the old cash cow propped up firmer on her feet. Introduce some new technology. Put your creative talents to work. Invent new ways of doing things."

"You've always wanted me to invent my way to salvation."

"It's the only way to go, George. It'll make you happy. Put your neurotransmitters in synch. Bring peace with the Wonder. If you make a hero out of him, he'll be your friend for life. He may even decide to pay you what you're worth. Perhaps then you can do something for Jamaica, too."

"Save Steel, get rich, and then save Jamaica?"

"I can't promise you'll get rich. Maybe you won't save Jamaica."

"But Steel—I don't know. Wally, you're thrusting decisions at me. Making me feel like Hamlet."

"In this life, everybody's Hamlet."

"Yeah. Compelled to choose between commitment to our own model, right or wrong, and half-assed commitment to someone else's we don't entirely believe in."

"Precisely."

"You're a hard man, Wally. Models are only models. If I pledge allegiance to this one you're pushing at me, what guarantee do I have that it's any good? Or that I'm any good?"

"What guarantee does anybody have?"

George stared at me for a moment. Then he turned towards the car. "Let's go have some breakfast."

On the way back towards Kingston, we gossiped about people we knew in common, what was the latest we'd heard on the grapevine, nothing important. I saw George was under a lot of stress, and was content to leave it like that. We ate at a roadside fast food place, and arrived at the club too late for the morning sessions of the seminar. We'd not been missed. No one censured us.

A couple of months after the Kingston seminar, I had business in Chicago, and contrived to arrange my affairs so that I was able, one afternoon, to drive over to Steel Division, just across the Illinois border.

Truth to tell, George had been on my mind ever since our excursion into the Cockpit Country. The Kingston seminar had proceeded without incident, though Boyd Jenkel had withdrawn early, pleading pressure of work, and had left our indoctrination primarily to his minions. They'd worked us hard, teaching us financial principles designed to carry us effectively through the next decade—pay your bills as late as possible, persuade your customers to pay early, work with other people's (i.e., not G.B.I.'s) money whenever you can, and so forth. There was some free time, and I naturally wanted to invest at least part of it in a follow-up of my conversation with George, who had, it seemed to me, been more impressed with my arguments urging him to invent, than he'd ever been before. Regrettably, George chose to avoid me. Said he had to spend as much time as possible with his family. Perhaps I'd pressed my case too hard, stirring up conflicts within him with which he could not cope. We were in separate study groups, and after the first day I never could find him between sessions. Later, when the seminar was over, and we'd dispersed to our own quarters of the continent, I'd called him a few times. He was never available. Always out in the shop (not unusual for an engineer). He didn't return my calls. Thus I was a happy patent attorney when the excuse came my way to visit him on his own ground.

Incidentally, not having to spend time in Kingston with George gave me more of an opportunity to see Jamaica while I was there. My cursory inspection of the country led me to believe Jamaican culture was far more robust than George believed, far less under American dominance.

Also incidentally, there were no rumors on the corporate grapevine to suggest a vendetta was developing between Jenkel and Oliphant. If Jenkel carried a grudge against the engineer, he'd apparently managed to contain it for the moment.

There were strong rumors that, cashwise, Steel Div. was doing badly, and that "Wonder" Boyd was not living up to his nickname. The times of that period, declaring we were evolving from a Manufacturing Age into an Information Age, frequently mentioned rising steel imports, and the decline of American smokestack industries. Despite that, I discounted gossip predicting catastrophe for Boyd Jenkel's operation. It's common management practice to circulate rumors of impending doom. The theory is, it'll make people work harder.

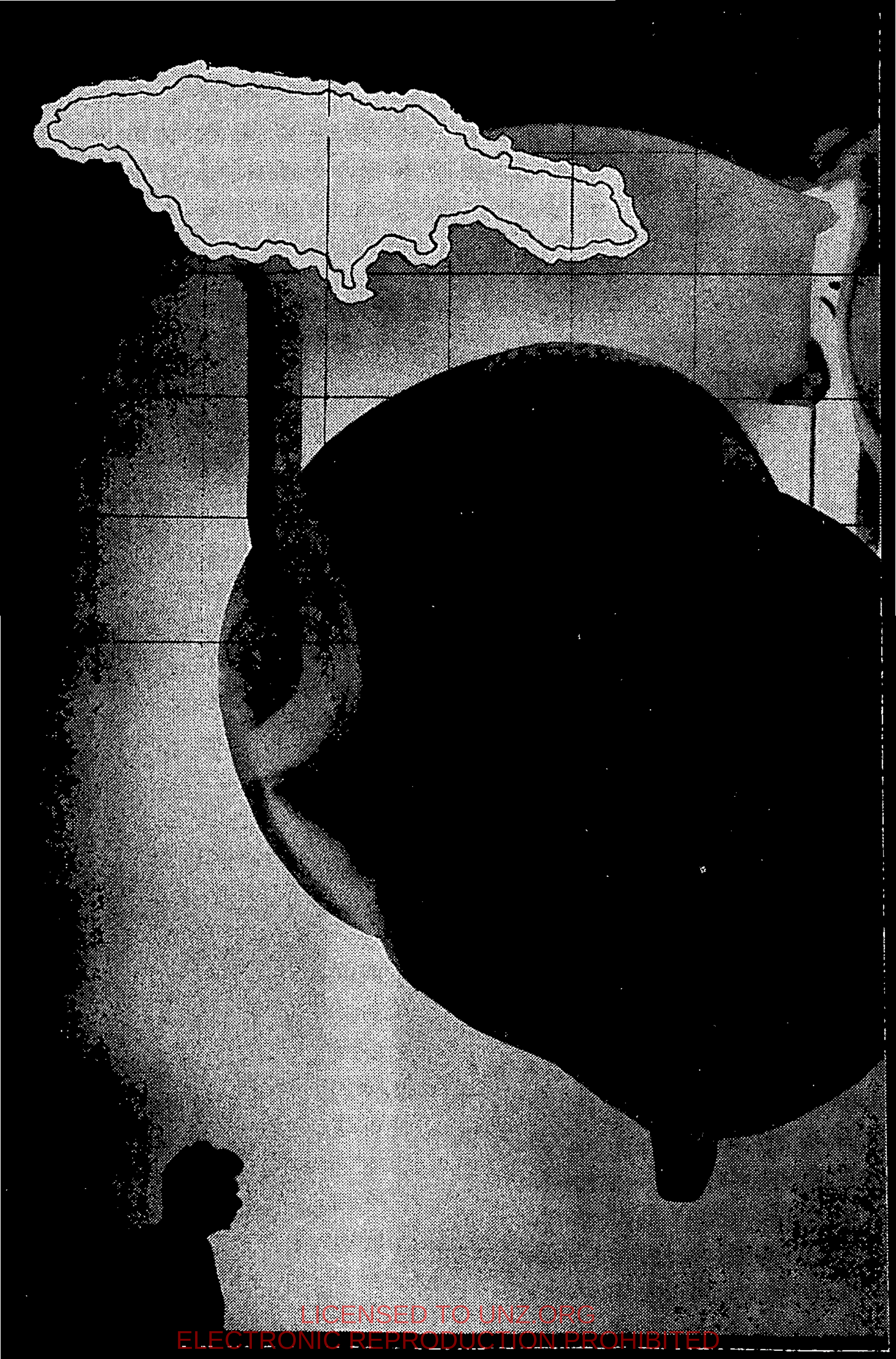
Apart from the opportunity to visit with George, I welcomed a chance to visit Steel. I've always been addicted to steel-making, to the smoke, the red demon flames, the pouring cascades of molten metal, the grumbling of the ferocious rolling mills, and the saw-song of silver steel strips gliding through them.

When I arrived at Steel that afternoon, Marv Mitchell, the division's president, had no red carpet laid out to welcome me. I could hardly blame him. It was much more than a rumor that the Wonder was about to replace him with his own man. Nevertheless, Marv, a rough and red-faced steel maker of olden times, spared a few minutes to receive me in his office. His office, since I'd seen it last, had become severely polluted with computer printouts. "It's a fucking mess," he said. "That damn Wonder of yours, our new master. He wants paperwork, paperwork, paperwork." I said Boyd Jenkel wasn't *my* Wonder. Marv went on: "Nice to see you, and all that, but the fucking day is long gone when I could spare time for friendly chitchat. How'd you like George to walk you through the plant?" He already had his phone to his ear.

George arrived almost immediately, bearing with him a hard hat for the protection of my valuable skull. He mumbled greetings. With uncharacteristic haste, giving me almost no time to note how thin and drawn he looked, he rushed me out to the plant.

Our tour started in the blast furnace shop. We'd have gone through it without pause, had I not insisted on taking a moment beside a gushing river of molten iron, to enjoy the delightful sensation one gets when one's front is being broiled, while chill drafts send shivers up one's spine.

At high speed, we went on to Steel Making, where B.O.F. furnaces, enormous vessels like upside-down rockets,



stretched their throats roof-wards, gargled molten iron, roared, belched flames, rolled over backwards, and vomited steel into huge ladles twenty feet across. I'd have liked to have stayed in that hellish place for a while, perhaps long enough for me to turn red, grow devil's horns and a tail. But George had other plans. Conversation there was, of course, impossible. He grabbed me by the arm, and dragged me onwards.

Just as we were leaving the shop, one of the furnaces made pour time, fell over onto its back, and began to discharge its load into a ladle. From the ladle came a muffled explosion. A firework fountain of steel spouted upwards. Fortunately it fell back into the ladle, there was no damage, and, as far as I could see, the pour continued smoothly. George did not react to the incident.

We moved on to Casting, where charged ladles from Steel Making are hoisted a hundred feet into the air, hover for a moment, then empty themselves into the casting machine. Casting was in progress, and I watched it emerge from the machine, bright as arc lamps, a ten foot wide ribbon of white hot steel, which, on other occasions, I'd heard George, in his quaint metallurgist's way, describe as frozen.

Too soon, he had me moving on once more. To Hot Rolling.

In Hot Rolling, George had me practically trotting to keep up with him. We went directly to the control pulpit. He gave me no time to look around, had me shake hands with the single operator up there, the choreographer who controlled the dance of incandescent steel ingots through the dozen or so unimaginably huge mangles which are the hot rolling mills, and hurried me down again.

We reached the final stop on our tour, Cold Rolling, which was a favorite of mine. From the operator's station to which he led me, I observed the huge tandem stand of six rolling mills, through which cold steel, pickled silvery white, and ten feet wide, uncoiled at a thousand feet a minute, screamed between the six sets of rolls, getting thinner, moving faster, until it emerged, beer-can or whatever thick, at ten thousand feet a minute. There is great power in the cold rolling process. I'd always been terrified of it, and that, perhaps, is why I've always been fond of watching it. Suppose one of the mills lost its coordination with the others? What if one of them jammed? If the steel should break? Had you a chance to watch that frenzied, shrieking operation, I'm sure it would frighten you, too.

At least, where we were, we and the operator were reasonably safe, isolated from the mills themselves. The operator, who'd just started a new coil, waited to see that it was running smoothly, and then had time for George and me. George made introductions. The operator was a short, fattish, rather grim-faced fellow. Name of Hank. I was shaking his grimy hand when suddenly the thing I'd always dreaded, happened.

Technically, it's called a "cobble." There was a falsetto roar like an agony of castrated lions in concert. Between the third and fourth mill stands, the rushing, gleaming ribbon of steel took on a life of its own, snaking upwards in a huge loop. It crinkled into the most terrible jagged concertina I ever saw, screamed, tore, shrieked, and snarled itself into a godawful mess.

I tensed, rigid, paralyzed. George kept his wits about him. He rushed to the emergency stop button and punched it. The mill motors stopped almost instantaneously (became generators, I learned later, enabling them to discharge the mills' energy very quickly). Still, there must have been at least fifty tons of steel twisted and tangled in the cobble. The shop was suddenly, ominously quiet.

Only then did I notice the mill operator was slumped down in a corner of his pulpit, hands covering his face. His shoulders shook as he blubbered and sobbed. George went over to him, raised him gently. "It's all right. Not your fault."

Hank lowered his hands, swallowed, looked out on the damage. He spat. "Fucking worn-out equipment," he said. He brought out a grubby handkerchief, wiped his face. "I'd better get on to Maintenance."

Hank's phone call was probably redundant. There were already distant figures in the shop, hurrying towards the mill stand.

George said to me: "Nothing we can do here. Let's go have a beer."

Shortly after, we found ourselves a vacant booth in a familiar neighboring blue collar watering hole. It was only mid-afternoon, but the place was already busy with shift-workers washing the day's grime out of their throats. I examined George across the table, and was disturbed. There were bags under his eyes, his melanin-pigmented skin was drawn taut and shiny over his cheek bones. We'd ordered a pitcher of beer. It came. George poured. He chugalugged his first glass. I refilled his glass and told him he'd done a fine job getting the mills stopped as quickly as he did.

George said: "All in a day's work."

"What was the problem with Hank?"

George bit his lip. Drained his second beer. "Hank has a daughter with leukemia. Big bills. Story is, that 'Wonder' of yours back at Corporate's looking for an excuse to fire him. Lower group insurance rates."

For the second time that day I had to deny that Boyd Jenkel was my Wonder.

"Whoever's he is, Wally, can you tell me what a guy like him, sitting in his big office a thousand miles away, has to do with life and death health care for Hank's little girl?"

To that I had no answer. I could do no better than say: "This cobble's no excuse for firing Hank. Is it?"

"Jesus knows. This I know. The American cultural model's never been able to get completely away from justifying slavery. Jenkel and his kind prove it."

"You're being a bit rough on us, George."

"Hey, when an employer uses medical benefits and such to get people so dependent they live in terror, isn't that slavery?"

"Jenkel's not so much to blame. It's that money model you talk about. He has to do what he has to do. Folks like him, with high responsibility, don't have it any easier than the rest of us. Maybe have it harder." I was victim of a fuzzy model, my loyalty to Mother Company compelling me to defend Boyd Jenkel. "You and I, at our level, can't understand their problems. Anything I can do for Hank? I saw it all. There's no way he was at fault."

"Damn-all you can do for any of us." George sipped more slowly his third beer, or maybe it was his fourth. He was still tense, but calmer. "Our equipment's all worn out. Was even before Jenkel came on the scene. We haven't spent a dime on anything new for twenty years. Have to work our tails off just to keep running, and if we fail, Corporate's just going to close us down, throw everybody out on the street to starve." He eyed me sharply. "Yes, there is something you can do. Get Corporate to give you a check for a couple hundred million. That's about what it'd cost to get us straightened out. You think you can do that for us, Wally?"

"I doubt it. But they're not going to close you down. I've seen the figures. They still have a half a billion dollar investment here. They can't just write you off."

"Sure they can. The tax man will pick up most of the loss."

"Some of it, I suppose. They'd more likely sell you."

"Who to? Who'd buy a run-down old plant like ours? The Wonder can't sell. He may kill us. He's cut back on everything, especially maintenance. You saw what happened in Steel Making. That bang in the ladle. It wasn't dried out properly after a reline. My fault, I guess, but with my staff cut I can't keep track of everything. Sooner or later there's going to be a fatality."

"It's not your job to keep track of everything, surely?"

"Damn right it is. Plant safety. Life and death. They're always Engineering's responsibility. We can't leave it to Production. Too much pressure on them to get the work out. They could care less, as long as they meet their quotas."

"You do have a Plant Safety Officer."

"Yeah, and you know why? To make sure G.B.I. has a legal defence if something goes wrong, and there's litigation. That's all he does. You're a lawyer, I bet you really appreciate his efforts!"

The bitterness in his voice took me right back to our conversation in Jamaica. To the way he avoided me afterwards. I felt our friendship was in jeopardy, and did not know how to save it.

George went on: "Worst of it, the Wonder has me doing nothing but write up process specs., record pretty little procedures on paper, write reports for him. Leaves me no time for what I should be doing. I'm turning into a damn lawyer myself."

"It's not a good idea to have everything written down?"

"For posterity? Sure, if what's written down's used right. The Wonder's model says, if it's all written down, I can get rid of the high price people, and have any young graduate from the Third World who can read come in and run things cheap. It don't work like that. There are always things that can't be written down. You ever hear of a gourmet cook who worked strictly from recipes?"

I said I hadn't.

"Besides, it's robbing the Third World. The way America does. Hires trained people away from home, where they're needed, and pays them less than they're worth."

That, I thought, was George's conscience berating him for leaving Jamaica. One good thing, he'd not ordered a second pitcher of beer.

"Remember what I said before, George? Steel can't get on without you. Jenkel won't be looking for any replacement for you."

"Want to bet on it?"

"He given you any special trouble since Kingston?"

"Not special. Just the usual."

"Remember something else I said? The best way of getting Steel out of its difficulties is invent your way out? Introduce new technology that'll give you an edge?"

"Sure, Wally. Just like that." George drained the dregs of his glass. Still didn't order more beer. "You're an inventions expert. Why don't you do it?"

"I'm just a scribe, George. You have to do the work."

"Me?" There was in his eyes the blankness of utter defeat.

By then, if I was to avoid the rush hour Chicago traffic, and catch my flight home, it was time for me to leave. I'd intended to ask after the health of George's niece, Ed'ina, but the right time to do it hadn't come up.

To tell the truth, it was a relief to be on my way.

A couple days later, I received a phone call from George. "If I was to try inventing something, Wally, how'd I go about it?"

I have a standard spiel I recite to divisional technical people when I need to whip up trade. I'd presented it at Steel a good many times, though George had evidently closed his ears to me. I gave him an extract from it. "A lot of the best inventions, you just take two or three things that're already there, and put them together for the first time. You might think along those lines."

"As easy as that?"

"Yes." He thanked me, and hung up, apparently satisfied. I sat back, glad to have heard from him, but not truly expecting anything to come of our conversation.

A few days later, he called again. This time he wanted to talk about aluminum. He'd been reading up about aluminum sheet, and it was cast in one step, directly from the melting furnaces. "Molten steel's too hot for doing that, though," he said. "Pity." I agreed it was a pity. He hung up again.

The next time he called, the subject was plate glass. "Those big sheets of architectural glass on shop windows and such," he said, "they're made by floating liquid glass on molten tin. Could that be done with steel? Not on tin. On some non-metal, denser than steel, where the steel would float and not react or dissolve—"

Sure, I told him, if you can find the right materials.

And next time, maybe a week later: "I think I've got it, Wally. Heavy metal oxides—hafnium, tantalum and such. Density's OK. With eutectics, melting point's OK. Non-reactive. We can melt 'em and float steel on them, just like the glass guys do with their tin."

By then he had me quite excited. Liberty George, passive Liberty George, seemed to be turning into an activist. I said, "Why don't you go ahead and fake up an experiment? Write me a patent disclosure. Let me know if I can do anything this end that might help."

Three weeks later he was back. "Not so good, Wally. My concept works all right in principle, but the gas in the steel comes out as it freezes. What I've got is kind of an out of control process for making steel lace curtains." Steel Div. has a well-equipped laboratory, but it was no mean feat of his to have put everything together for an experiment in that little time.

I said: "So, you'll have to run it in vacuum, pull out the gas."

"Yeah. I figured that. Another thing. Texture. Rolling the steel puts texture in it. Only way to match that is to control the rate of freezing very precisely. You think we could do that with electron beams?"

"That'd take high vacuum. Won't the heavy metal oxides dissociate in high vacuum?" I felt proud of being able to provide a smidgeon of technical input.

"I guess they will. How about ion bombardment? Argon. Plenty of argon around the plant. Then I can keep the pressure a lot higher. Maybe I could run a test, use a welder as a power source."

"Try it, George."

Next thing I heard from him, he'd done it. How he managed to fund his experiments I never discovered. Doubtless they didn't cost a lot of money, but it must have been enough, in those tight times, to be picked up by eagle-eyed accountants. Perhaps Marv Mitchell, about to be terminated, authorized the expense in a spirit of defiance. Perhaps George, with the typical cunning engineers are obliged to develop when dominated by financial people, found a way to circumvent the system. However it happened, he was able to get enough of the necessary out of somebody to set up a little pilot plant.

He sent me a movie of his plant in operation, along with his patent disclosure. It was magical, a black box, with molten steel going in one end, and a finished strip coming out the other. What he'd produced was only an inch wide, but the sample he included in his package to me looked real good.

George's patent proved easy to research and write up. I could find no prior art. The final script flowed from my pen with not one faked up word in it. Ms. Lee typed it. I got all the necessary signatures, using my own resources of cunning to avoid having to include Jenkel's. The application was mailed off to Washington. A check was mailed off to George for three hundred dollars, G.B.I.'s standard payment to inventors.

George did an economic study, part of a proposal he submitted to Boyd Jenkel. He sent me a copy, more, I suppose, as a courtesy than for any practical reason. I don't have anything to do with economics. His figures indicated a scaled-up plant in the capacity range of Steel Division, based on his invention, would cost about forty million dollars. To replace the worn mills in Cold Rolling alone would cost close to four times as much. His process would, of course, eliminate Hot Rolling. His sheet and strip, he reckoned, could undersell conventional product by fifty-six dollars a ton, and still produce increased margins.

I expected soon to pick up jubilant rumors from the corporate grapevine, forecasting the salvation of Steel Div. No such rumors circulated. At the time I was particularly busy, but did manage an occasional call to George, partly to see if he'd come up with any more inventions—engineers, once their creativity has been liberated, often produce a torrent of them—partly to see if he'd heard anything concerning the implementation of his process. He had no fresh disclosures for me, and his proposal was still being studied.

Then George called me. He'd been selected by new corporate rules for forced early retirement. It was his last day of working for Steel. "Goodbye, Wally."

As soon as George was off the line, I galloped past Ms. Lee's desk in my outer office, charged to the elevators, and rode one up to the thirtieth floor, where Boyd Jenkel reigned over us. Ignoring his secretary, I dashed into his office. He was perched at his computer terminal on a raised stool that compensated for his short legs.

"What's this nonsense about Oliphant being forced to retire?"

"Oliphant? Oliphant? Do I know anyone of that name?"

"George Oliphant. Steel Division."

"Oh, that one. Our token black. Times have changed. We don't need token blacks any more."

"Listen, George is a damn fine engineer. Has done a damn fine job for us for more than a quarter century. A token he never was. A token he'd never be."

"Calm down, Wally. Whatever you say, you must know in your heart people of the darker race are all the same. But if he'd been white, I'd still have retired him. A policy of mine. Never keep engineers too long. Hire them for a specific project if you can. Then let them go when they've done it. No long-term service. No investment in the pension plan. Saves a lot of money."

"You mean George doesn't even get a pension?"

"Hah, we made a mistake there. Kept him too long. He was cunning enough to get himself vested. Wasn't he the guy, by the way, who made such a nuisance of himself at the Kingston seminar?"

"I wouldn't say he made a nuisance of himself."

"He did, you know. In my view."

"What about this new process of his?"

"New process? Oh, yes, I did receive some sort of proposal or other from him." Jenkel shuffled off his stool and went over to his desk. Took a folder from one of the baskets. "It calls for spending money. I can't make much sense of it."

"You mean you're not going to implement it?"

"Of course not. Put capital money into Steel, when we can get three times the rate of return investing in credit cards? You must think I'm stupid, Wally."

"Yes, indeed I do!" I removed myself from his office as quickly as I'd entered it. George told me once, the biggest problem with management's model is, it prohibits upwards communication from lower levels. I saw that was absolutely true.

Later, I tried pleading the invention's case to others in high office, to no avail.

With the usual delay of a year or so, George's patent was issued.

After George's retirement, I heard nothing from him, nor had I any means of getting in touch with him.

Nothing further happened until the fall of 1986. Then two representatives from Tanaka-Ohio-Pacific visited us in Connecticut. Mr. Tomita, and Mr. Mori. They wanted to license George Oliphant's invention. That was good news for the Wonder, who was in dire need of any income he could find to keep his cash cows on their feet. Since this was a patent concern, he naturally required me to attend the negotiations when he met with the Japanese gentlemen.

We had reached an impasse. Mr. Tomita declared: "So sorry. Not possible to complete our business unless we can do face-to-face with inventor."

Mr. Mori nodded.

"Wonder" Boyd pursed his lips. "That may be rather difficult." It may indeed, I thought. After what he'd done to George Oliphant, it seemed quite unlikely that George would cooperate. "The inventor has retired."

"We want very much this process. We think it is very good process."

"I really can't see what the inventor has to do with it, anyway," said Boyd. "Everything's fully documented. We have all his reports and so forth. And we'll give you any technical help you need."

"So sorry." Mr. Tomita's toothy smile gleamed golden. "We have tried many times to work from paper without human contact, *ne?* Is much easier with human contact."

"Mr. Tomita is perfectly right," I inserted, wishing to be helpful. "There's nothing like having the inventor on the spot to put his own invention on line."

"Also," said Mr. Mori, until then the silent partner of the two, "if we have the inventor, and his process is good, we may wish to buy from you your Steel Division. We shall then install the new process there, and gain ourselves an operating position in the U.S.A., *ne?*"

Such a possibility had not previously been mentioned. Beyond drawing one deep breath, Boyd Jenkel displayed remarkable self-control. For the license, we were talking a quarter million, plus a quarter percent of net sales using the process. For the Division, run-down cash cow though it was, ignorant though I am in matter of finance, I fancied we'd be talking more like a quarter billion. Quite coolly, he said: "That does put rather a different perspective on this transaction."

By then, there was nothing Jenkel would rather do than sell Steel—people, furnaces, rolling mills and all—and be done with it. His poor results in good times had seriously jeopardized his career. Indeed, he, the former rogue queen, had been thoroughly neutralized. The kings feared him no more. He'd become high man on their shit list, while his peers prospered. There were probably but two choices open to him: leave G.B.I. (but could he find another corporation where his family wielded stockholder power?), or take his cows to market.

Jenkel turned to me. "Wally, I seem to remember you're an old friend of Oliphant's. Do you think you could track him down for us?"

Reluctantly, I said I'd try.

Both sides agreed to meet again on the Friday of the following week, which gave me just nine days to find my man. The meeting broke up. I returned to my office.

After calling a few of George's former friends at Steel, and learning he'd not kept in touch with any of them, I delegated my missing person search to Ms. Lee, famous worldwide for her resourcefulness.

Ms. Lee checked with G.B.I.'s pension fund, but drew a blank there. George's pension checks were paid into a numbered account in the Cayman Islands. She called a number of her cousins—she has a vast network of cousins located at strategic sites throughout the world—I.R.S., Social Security, CIA, maybe even KGB—but still without results. Finally, in a stroke of genius, she secured for herself a Kingston, Jamaica telephone directory, and worked through the Oliphants. George was number six on her list. She had no difficulty getting him on the phone for me.

I told George why we needed his help, not, however, mentioning the Tanaka proposal to buy Steel Div. Loose talk of that kind can lead to insider trading suits. He asked: "Is Jenkel still in charge?" I told him, yes. "Then I have absolutely no interest in wasting my time helping him."

"Surely, George—for your old friends at Steel?" But George was adamant. Apart from anything else, he said, he was much too busy to come to Connecticut.

I reported failure to Jenkel. "There's only one thing for it, Wally," he said. "You have to go to Jamaica and fetch him back. If you return empty-handed, you know what to expect."

Too well I knew. My job was secure enough, but a staff person like me, who crosses a high officer of the company, his life can be made a living hell.

Thus I agreed for a second time to visit Jamaica.

It took numerous phone calls, over several days, to get George to let me come and see him. Meanwhile, Jenkel assigned a couple of his cronies to prepare me for my task. They put together for me a presentation one of them might have used to sell a new stock issue to a bunch of underwriters. Big, glossy charts, beautifully drawn on glossy cardboard ("You'll have to use this primitive stuff. They won't have audiovisual in a little third world country"). Besides the charts, they gave me a great deal of advice, and guided me through rehearsals, rehearsals, rehearsals. None of this was my style of doing business, but orders from the boss were orders from the boss. You can't fight City Hall. I was obliged to go along with it. When Wednesday, the day of my journey, arrived, I was an entirely disheartened presenter: nervous, unconfident, confused. Luckily, the early morning flight o'er continent and ocean restored my spirits to some extent. Flying usually does.

My first impression of Jamaica, prematurely arrived at just outside the airport concourse, was one of increased prosperity. There were fewer of the beachcomber porters than on my last visit, and those there seemed to be wearing new old cut-offs rather than worn-out old cut-offs. There were no street musicians. I attributed the apparent improvement to fall-out from good times in the United States.

The cab I flagged down was a poor choice. It was small, awkward to get into with my oversized bag of Jenkel charts.

My driver swiftly brought me to the Kingston address I'd given him, a towering, somewhat drab building on the edge of, but not part of, yankee-town. After paying the cab, I entered a cramped foyer where a uniformed guard sat at a substantial desk, armed with telephones. Behind him on the wall an ornate scroll read:

YOU ARE ENTERING THE
INFORMATION AGE

The significance of the message eluded me.

The guard took my name, made a call, told me I could find Mr. Oliphant in his office on the tenth floor, if I cared to take an elevator up. He was exceptionally polite.

I went up. George apparently had an office suite. There was a door with his name on it, and inside a spacious secretary/receptionist area out of character with the building—carpeted, tastefully decorated, much like those back home in the Corporate Tower. A bespectacled young lady waited to receive me. She said Mr. Oliphant would be with me shortly, and had me sit down.

George took his time. When his secretary, after being buzzed, nodded towards a door behind her and told me I could enter his sanctum, my stomach was rumbling, demanding lunch. I opened the door and went through.

The office in which I found myself was as large and well-appointed as any high executive's office I'd ever entered. George sat behind a desk bare of paperwork. He stood to greet me. He'd put on weight, and his hair, cut in what used to be called a natural, had turned iron-grey. I wondered whether, in the old days at Steel, he'd used Grecian Formula. There was an air of self-assurance and dignity about him I'd not seen before. We shook hands. As he guided me to an armchair in the visitors' area of the office, I congratulated him on his luxurious quarters.

"Designed solely to impress important visitors such as yourself," he said. "I did learn one or two tricks from Jenkel and his kind. My living quarters, I assure you, are much more modest." He seated himself opposite me. His secretary brought coffee. "Pure Blue Mountain," he told me, "from my brother's plantations."

I sipped my coffee, pronounced it excellent.

George said: "Well, Wally, it would be nice to engage in idle chatter concerning our former acquaintance, but I perceive your model is not one which permits wastage of time. Suppose you show me what you have brought for me." He nodded towards my bag of charts.

Nervous as I was, I, too, wanted to get this done as quickly as possible. But I couldn't resist asking if he was in some kind of a business. "Or is the rate of exchange so good your pension can pay for all this?"

"I'm in some kind of a business." He smiled. "Actually, this whole building is dedicated to my affairs."

I started. "Then you must be getting rich. You remember, that day we went for a drive, I promised you you would."

"I seem to remember you declined to make me that promise. What do you have in that enormous bag of yours?"

I opened the bag, looked around for an easel to support the charts, but there was none. So I stood up and parked them upright on the chair. "You know why I'm here, George. To appeal to your loyalty, your memories of happy times long past. To persuade you to return to Mother Company and help us in our hour of need." (The words had been put in my mouth by Jenkel's people—"Appeal to his sentiments. Get him emotionally involved.") "Now, if you'll look at this first chart here—"

My first chart showed an update since George's time of Steel Division progress, much the sort of thing local managements present at planning time. Graphs of profit and loss, cash flow, return on investment, and so forth with moving averages, and similar diagrams for the steel industry as a whole, but with numbers, as my tutors put it, massaged to demonstrate there had been a serious down-turn when George retired, from which we'd slowly recovered. ("Butter him up. Show him how important he was.") Nonetheless, they couldn't disguise the fact that long-term trends were down.

I stuttered my way through that chart, then put it at the back of the pile, revealing the next one, which projected the same data into the future, this time two curves on every diagram. The first of these, trending dismally downwards, promised little good fortune to Steel. The second, adding in income from the licensing of George's patent, first to Tanaka, then to others, painted a rosier picture. I'm afraid I don't believe in soothsayers, and did an unconvincing job of persuading George he could provide Steel with a glorious future.

My third chart dealt with subjects of not much more interest to me. Personnel. Productivity per man hour, per dollar of investment. Equipment status. Finally, accident rates.

"There was a flurry of accidents soon after you left. Your leaving had a lot to do with it." (More buttering up.) "We have it under control now." (I'd been particularly cautioned not to mention, and didn't, our one fatality. A maintenance worker who was obliged to make adjustments on the fly to one of the cold rolling mills was caught up in a cobble like the one I'd witnessed, and was chopped to pieces. Luckily the plant safety director was able to talk our way out of serious liabilities.)

Lastly, I had a collage of photographs of Steel people at work. Old friends of George's. ("Hit him in the gut.") One of those depicted was Hank, the cold rolling operator. George picked him out. "Hank's still got his job?" "Certainly." "What happened to his daughter?" "She died." "Lucky Hank." I felt I was not making much progress.

There were no more charts to help me. I had a bit to say about G.B.I. picking up George's expenses, remunerating him for his time, then ended with a lame: "So there it is, George. Steel's future pretty much depends on you." I put the charts back in their bag, and sat down again, knowing I'd done badly.

George thought for a moment. "I

should like to help. But I really do not have the time to spare."

That, I felt, was not a total rejection. Victory still might be achieved if I abandoned the Jenkel method. "Sorry to have been such a bore. I told them back in Connecticut their charts wouldn't impress you. Tell me, George, I'm curious. What keeps you so busy?"

George smiled. "You will recall that I used to be a vacillating individual, unable to commit myself to any particular model. One who felt like Hamlet, I believe I told you. To which you replied, everybody's Hamlet."

"I remember the conversation."

"My debt to you is rather large. At that time you also encouraged me to forget grandiose aspirations, to focus my energy on affairs which I had some power to influence."

"Yes. You wanted to save Jamaica. I wanted you to save Steel. You came close to doing it, too. Now I'm giving you a second chance."

"But I am now also in a position to save Jamaica. At any rate to save us from colonialism and the monoculture. Which is more important, Jamaica, with its two million lively people, or Jenkel's Steel Division?"

"It's not Jenkel we're considering. It's your old friends, your former colleagues. Your Jamaica project still sounds grandiose to me. One person can't have much of an effect on an entire nation."

"No? But you showed me the way there, too. You remember we concluded that the country, as well as the Division, needed only to stand on its own feet to survive?"

"And do you plan to get Jamaica to stand on its own feet?"

"Certainly. You saw our motto in the hall when you arrived here, Wally. Here within these walls you are living in an information age. In such an age, any small nation, if motivated, can become independent of all other powers."

"Any small nation that is prepared to struggle on at the subsistence level can do that, certainly."

"No, Wally, at a level far higher than mere subsistence. The world, for several centuries, has based its economic structure, and, I might add, most of its wars, on trade. The transfer of food, raw materials, and manufactured goods from country to country. In an information age, given enough information, the need for such transfers and trade wars can be banished."

"That's nonsense, George. There's no way you can become self-sufficient, and maintain a high standard of living."

"But there is. Consider Jamaica. We are not badly off for food. We are short on energy, and must import oil, coal, and so forth. But we are blessed with an enormous reservoir of solar energy. If we can acquire sufficient technological information to use it, we can become energy independent, which is the first step."

"You'll still need to import the necessary equipment."

"Not at all. Clearly, silicon will be the basis of solar power. Jamaica, like every other country on Earth, is blessed with enormous reserves of silicon. That resource also guarantees we can, in addition, satisfy our electronic and communications needs."

"And metals? Steel? You've often told me steel is the backbone of modern prosperity.''

''Aluminum is a very good metal. It can do most of the things we need metals to do, and is, like silicon, available everywhere. Here, fortunately, as bauxite. Elsewhere as clay. As to other metals, the ocean is a good source, genetic engineering can construct bacteria that will concentrate them. And plastics —let's not forget plastics—can be manufactured from vegetation, or, given enough information and available energy, from carbon dioxide in the atmosphere. Genetic engineering, by the way, can also enrich our diet, provide medicines, and do many other things for us.''

''This is fantasy. Two hundred years down the road, yes. But not now.''

''Now, Wally. Or in five or ten years. That is my model. It is a good representation of reality. In modern times, the material content of goods has shrunk. Their information content has expanded. The new knowledge we have acquired allows us to reach a desirable end by many different paths. I have been fortunate to convince the government of Jamaica of the validity of my model. They are funding us. Not munificently. But adequately, provided we are sufficiently motivated to tolerate a rather low standard of living.''

''A low standard of living. Precisely. Imports here will always be cheaper than locally manufactured goods.''

''What is cheaper? What if, in order to import Japanese television sets for some of us, half of our population has no work? What if, to guarantee our imports, we have to yield our liberty?''

''Even if these things you're talking about are possible, you'll need an army of experts to implement them.''

''In an information age, experts can be developed quite quickly. A bright, motivated person in a hut, with the right books and a supply of candles, can develop expertise to overthrow a world paradigm. As it happens, however, we have a vast reservoir of talent to tap.''

''You have?''

''Yes. Of expatriate Jamaicans like myself, who want to come home. I have appointed Ed'ina—you remember my niece?—to be my emissary. She scours the world for such people, and has met with considerable success.''

''And they work here, in this building?''

''Some of them. We have other locations. Our priorities are, one, solar energy development. Two, materials science, particularly aluminum and silicon metallurgy, and organic chemistry. Three, genetic engineering and biochemical science. Four, a favorite of my own, since our ultimate objective is to ensure that the Jamaican cultural model is not swept into oblivion, research on the nature of models. By anthropologists, psychologists, philosophers of science. That, I admit, is something of a luxury at the moment.''

''All this, to escape the benevolent protection of the United States?''

''All this to be free, Wally. I may on occasion have sounded critical, but I have no basic quarrel with the American cultural model. A large portion of my life was spent in your country. I count many Americans among my friends. My wife is buried there.'' (I had not known George had been married. Personal details are rarely disclosed in corporate friendships such as ours.) ''We are, after all, cousins. Both the American and the Jamaican models have their roots in the British model of the seventeenth century. Neither is fundamentally unsound. But there must be diversity. For the sake of the long-term future of humanity, there must be no monoculture."

"I presume you, personally, will take charge of the development of Jamaican culture?"

"Not at all. I have learned from you to be content with limited objectives. When this island is fully liberated, it will be a matter for all the people to decide what to do with their liberty."

"You've been sermonizing me for half an hour George. I wish you luck." It seemed my own project must end in failure. Then I was suddenly inspired. "You know, if I can bring you back to Connecticut, the Japanese company will buy Steel Div." That was something I was not supposed to tell him, but it was my last hope.

George rolled the concept around in his head for a few moments. "You want me to help the Japanese colonialize the United States? Beautiful people they may be, but I'm not sure I want to do that."

"You won't be. We, of all people, will never again be a colony."

"No? The Japanese ship you a lot of trinkets, don't they?"

"Yes."

"They loan you money to pay for them? And now they want to give you jobs to the same end?"

"That's true, I suppose."

"How does this differ from Jamaica under British rule?"

"Take it from me, George, it's different."

"You mean you subscribe to a model that projects it to be different. However, you have placed me in something of a dilemma. I do not wish to promote the colonization of America. At the same time, if I could get some Japanese money—free and clear, no strings attached, you understand—it could greatly assist our project here. Wally, once again, you have me in a Hamlet quandry. How much, by the way, does Jenkel expect to be paid for Steel?"

I said I didn't know. He continued. "Four hundred and fifty million is my guess." That was precisely the figure leaked to me by one of Jenkel's assistants, an I-know-something-you-don't lad who couldn't keep his mouth shut. I marveled at George's percipience, but did not confirm his estimate. He was silent for a full minute. Then: "All right, Wally. This may very well be saving Boyd Jenkel's ass, but I will come to Connecticut."

There's not a great deal more to tell. The following Friday (I'd been with him on the Wednesday) George turned up at Corporate as he'd promised. Mr. Tomita and Mr. Mori were in attendance, along with Boyd Jenkel and myself. Detailed arrangements were worked out for George to work part-time at Steel, and for G.B.I. to pick up the tab for him to commute from Jamaica.

Finally, when everything was settled, and George, pen in hand, was about to sign the contract we'd (mostly, I'd) drafted, which had been typed up while we adjourned for lunch, he looked up and addressed Boyd. "How much will you charge Tanaka for Steel?"

"Is that relevant?"

"It is."

"We, too, would like to know what you are proposing," said Mr. Mori.

"My understanding, Mr. Jenkel, is that you propose a figure of four hundred and fifty million dollars."

Boyd wriggled in his chair. "The matter is still under study—"

Mr. Mori said: "We have thought three hundred and ninety million."

(I should explain that both G.B.I.'s and Mori's figures were not mere spur of the moment numbers. I knew they had a lot of staff work behind them.)

"You're both wrong," George said. "The proper figure is two hundred and twenty million. Anything higher, I'm off back home, and there's no deal."

This was not the way G.B.I. normally did business. Nor was the matter immediately settled. But after a considerable amount of bickering, George's figure was agreed to in principle. He signed the contract, and when, later, the Wonder tried to renegotiate, George so comported himself that he prevailed.

Nonetheless, two hundred and twenty million was enough to save Boyd Jenkel's career. He eventually became one of the Six Hard Men, though he never made president of G.B.I.

A year or so after George signed his contract, when his new plant was just coming on stream, word came through the corporate grapevine that our former Japanese partner—they by then had full charge of Steel—supplied to a research operation in Jamaica, no strings attached, a very large quantity of money. Many tens of millions of dollars. I presume the rumor was well-founded.

Twelve years have past since the events related above occurred. George's process for making steel strip is now standard world-wide. I haven't been able to keep in touch with him. He's been far too busy.

What of his attempt to rescue Jamaica? Well, nothing much was heard of it until the early nineties. At that time, you'll remember, great nations and empires all around the globe were beginning to break up. The Soviet colossus. Canada. Wherever a minority culture existed, it seemed, secession was the order of the day. No one took much notice of an unimportant Caribbean island.

Then George published his book: *Self-Sufficient Nations*, which offered a recipe for independence, with full technical details. His motivated researchers, not out to secure grants or achieve personal notoriety, had out-distanced better funded counterparts across the world. The book presented not merely concepts, but concrete examples of their implementation.

Jamaica by now, it seems, is economically self-sufficient. Many other small states and cultures, not to mention some of the States of the United States, have subscribed to George's model, and appear to be approaching self-sufficiency. No longer do great argosies ply the oceans in such numbers as they did a decade ago. There has been a major decline in worldwide trade.

In Jamaica, if the reports I hear are true, there has been a great liberation of the people's time. For one thing, the tourist trade is greatly diminished. The future of Jamaica's cultural model appears assured. At any rate, it will not be distorted by monocultural imperialism.

What happens next? I don't know. These events do illustrate rather convincingly the validity of a long-held thesis of mine. Once the creativity of a good engineer is liberated, there is no predicting what may come of it.

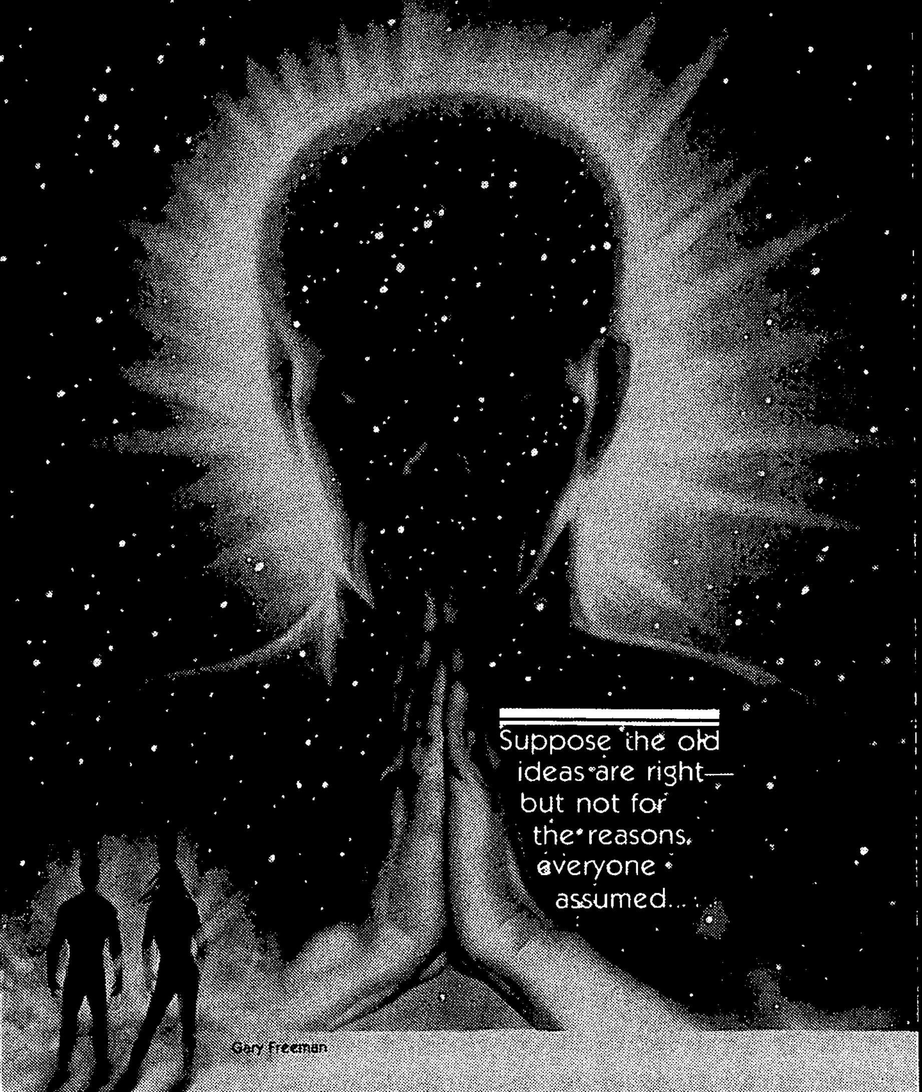
Of one thing I am reasonably sure. George Oliphant's neurotransmitters are perfectly in synch. ■

IN TIMES TO COME

● Last year Vincent di Fate, long a favorite of *Analog* readers, was one of six American artists chosen to observe and visually document the preparation and launch of the orbiter *Atlantis* as part of NASA's Fine Arts Program. The idea was that an artist will see and interpret such an event in ways that a camera cannot, and different artists will bring different insights to it. Di Fate's special skills and long-standing interest in the space program make him particularly well qualified for such a task. In our August issue he shares his experience directly with you, our readers, through both a dramatic cover and a fact article drawn from his trip journal.

The lead novelette will be Michael F. Flynn's "Captive Dreams," a story in which both the highly original idea and the quietly disturbing human drama will haunt you for quite a while after you read it. What if "retarded" people are exactly that, in a more literal sense than you've ever imagined?

Rounding out our August line-up will be a diverse collection of intriguing stories by Jerry Oltion, Jayge Carr, Arlan Andrews, G. David Nordley, and Francis Marion Soty.



Suppose the old ideas are right— but not for the reasons everyone assumed...

Gary Freeman

NOT ENOUGH TO GO AROUND

Grey Rollins

'91

The thunderstorm had passed through about three in the morning, leaving in its wake a steady, drumming rain. The streets of Columbia, South Carolina, were shimmering quicksilver against black as water ran into the overflowing gutters.

Amos Hardy swiveled his stool back around from watching the rain through the big plate glass windows facing the parking lot of the Krispy Kreme. Shaking his head, he said, "It's about time it rained. My yard looked like rusted steel wool."

Doris, a young black girl, looked back over her shoulder at him and smiled. This was only her second job, and she had yet to acquire the world-weary patience of Janice, the other waitress. "If it isn't growing, you won't have to mow it as often."

Hardy grunted and nodded to acknowledge her point. "I suppose so. Still, I wish I could get my grass to—" Beside him on the worn counter his radio squawked and announced that there had been an accident on outbound I-126 where it crossed the Broad River.

"Crap!" he muttered under his breath. "Doris! I need—" He stopped when he saw that Janice was already moving to take care of his bill. She also tossed a green and white box on the counter. "What's this?" he asked.

She grinned. "Well, there were a half-dozen doughnuts from that last run that didn't look quite right. Couldn't go puttin' them out to customers like that. I figured that you might need somethin' to eat while you're out there," she said, nodding at the fat raindrops dancing on the roof of his police cruiser.

He shook his head as he counted change. "Thanks. You folks make the best damned doughnuts in the world, but your marketing's all wrong. Just goes to show you that quality alone won't do the trick." He winked and grabbed the box and stepped out into the rain.

It was a two-year-old white Toyota, impacted diagonally into the unyielding concrete guard on the inside lane. The left front wheel had snapped on impact and was tilted back under the car. Hardy parked two car lengths behind the Toyota so that the wrecker would have room to work and flipped on his blue lights. There really shouldn't be any problem. The Interstate spur was four lanes going each way as it spanned the river; at this ungodly hour of the morning there was unlikely to be enough traffic to matter. As long as they saw his blue lights and slowed as soon as they came off the feeders from downtown, they would have plenty of time to get over into one of the other three lanes.

The ambulance was already there. A man and a woman were reaching into the cramped space allowed by the warped driver's door, working with practiced efficiency. Hardy walked up to the woman and said, "Doesn't look like there's going to be much traffic for me to direct. What can I do to help?"

"At a quarter past four in the morning, I hope everybody stays home in bed where they belong." She pointed over to the passenger side of the Toyota. "Do something with the kid. He doesn't seem to be hurt, but I'm sure that it isn't doing him any good to watch this."

Hardy studied the man. His head was lolling back against the headrest. "How bad is he?''

She shrugged. ''Don't know. He's incoherent. We're not taking any chances . . . might be a neck injury.''

Hardy nodded and walked around to the other side of the car. He pulled the door open and squatted down so he would be on the same level as the boy. About six, he guessed, blond with big, frightened eyes. ''You OK?''

For a moment, he was afraid that the boy wasn't going to answer him, but he finally spoke. ''Yeah, I'm all right.''

''You get banged up any?''

The boy looked across at the paramedics as they slipped a neck brace on the man in the driver's seat. ''No . . . I . . . no. Is my Dad going to be OK?''

Hardy glanced across the interior of the Toyota. ''You have any objection if I put the boy in my car?''

''No. Go ahead.''

Gently, Hardy reached out and undid the boy's seat belt, acutely aware of the water dripping off of his rain coat into the boy's lap. ''What's your name?''

''Jeremy,'' he said, turning to watch the paramedics undo the seat belt around his father. ''Is my Dad going to be all right?'' he repeated.

''They're helping him now. Come on.''

Reluctantly, Jeremy slid out of the car seat into the rain. Hardy undid the front of his yellow rain coat and held one side over Jeremy's head to form a crude umbrella. As they walked up to the cruiser a car approached, but it carefully stayed in the far lane. Slowing as it passed, blurred faces pressed against wet windows, looking for gore.

The boy slipped out from under Hardy's coat into the front seat. ''What's that thing they're putting on him? Is he going to be OK?''

Hardy grimaced. ''You stay right here and I'll go check on him, all right? Get a doughnut out of that box if you want one.''

With that, Hardy turned and walked back to the side of the Toyota. They were just getting the man laid out on the stretcher. ''So what's it look like?''

The male paramedic glanced up and shook his head. ''Somebody saw it happen, said he was doing fine—going down one of the middle lanes—then just veered off into the railing. They pulled in at a gas station down the road and called. We got here about two minutes before you did. Had time to check the kid and were just starting on this fella when you drove up.''

''The kid says this is his father and keeps asking whether he's going to be all right. Give me some words of encouragement.''

The man shook his head. ''Can't tell you anything worthwhile. He was muttering when we got to him. Nothing I could understand. I'm hoping he's just shook up.''

''*Huedodo!*'' the man on the stretcher crooned, eyes closed. His lips puckered as though drinking through a straw. ''*Daynono*,'' he said softly.

The paramedic looked up at Hardy. ''That's what he was doing when we found him.''

''Sounds kinda familiar, somehow.''

The female paramedic looked at Hardy as though he were crazy. ''Familiar?''

''Well, yeah, I mean it sounds like he's saying something, but in a foreign language."

"*Woonay sadee . . .*"

Hardy snapped his fingers. "Got it! Sounds like one of those Indian languages."

"This guy doesn't look like he's from India," she said, surveying the light skin and blond hair.

"Not that kind of Indian. . . . American Indian. . . . Native Americans."

She shook her head. "Doesn't look like that kind of Indian, either."

"*Oosonay hundaday.*"

"Sounds like pig Latin, if you ask me," the male paramedic observed. "Let's get a move on. You two can argue languages later, if you want."

The man on the stretcher opened his eyes, heedless of the raindrops falling into his face. He seemed to focus on Hardy. "*Huedodo nayso hundaday,*" he said earnestly. "*Saysoon wayonay ha noteehah shonay shonee.*"

Frowning, Hardy said, "I'm sorry, but I don't understand you. Can you speak English?"

The man's eyes left Hardy. "*Hundaday!*" he called loudly, staring up into the rain. "*Wayonay,*" he cried once more, softly. Then the light seemed to go out of him and his eyes closed. He collapsed inward on himself like a balloon deflating.

Hardy felt cold chills run down his spine. Irrationally, he was suddenly convinced that the man was dying. "Go!" he told the paramedics and started back to his car.

Through a long chain of circumstance, Hardy got saddled with the unpleasant task of calling the man's wife. Normally the hospital staff would have handled it, but they were shorthanded.

She took it well. Snapping awake instantly, able to think coherent thoughts almost as soon as she heard his apologetic voice. She had the wit to want to know whether she should pack pajamas and a toothbrush . . . would he be in the hospital long enough to need them?

Suppressing his conviction that her husband was soon to be beyond the need of all worldly things, he told her yes. It always seemed to help people to have a useful task to perform.

Now he sat with the boy and his mother for a few minutes before leaving to finish his shift. Just as he was getting ready to stand, a thought occurred to him. "Ma'am?"

"Call me Jean, please." She was tense, but holding up well under the strain.

"Does your husband know any foreign languages?"

Her mouth opened before the words came out. "Um, no. I don't think so. John took some . . . Spanish, I think, in high school, but I've never heard him use any of it. Why?"

Hardy glanced at Jeremy, trying to gauge how much to say. "Well, when the paramedics were putting him on the stretcher, he was saying something. To me it sounded like one of the Indian languages."

"Like Cherokee or something?"

"Yes. I don't know enough to tell Indian languages apart, but it had that same rhythm to it."

Now she could see his point in asking, but that only made her more confused. "No. I'm sure he doesn't know any Indian languages."

Hardy felt bad for mentioning it. He

generally tried to protect people from the more gruesome aspects of times like this, but they might have been the last words of a dying man; they might be important to someone.

He nodded. "OK. Look, if there's anything I can do for you, let me know. I've got to go back out on patrol now, but if you need a lift somewhere, I'll be getting off in about an hour."

"Thanks, but I've got the other car here. I'm going to hang on until I get some word from the doctor." She shook her head sadly. "They say it looks as though he fell asleep at the wheel. He'd been up to Conway to visit his parents and was late hitting the road home. He called just before he left so that I wouldn't worry. Now . . ." She looked at Hardy, eyes bright with unshed tears. "I'm sorry. Go on. I know you have a job to do."

The rain was down to a thin drizzle as Hardy walked across the parking lot. For no good reason, he was convinced that the man had been coherent when he had said those things. It bothered him not to know what the words meant.

It was three weeks before he got the next one. An elderly woman had walked out onto her front porch. She called to a neighbor across the street, saying what a fine evening it was and wasn't the sunset beautiful. Before her neighbor could reply, the woman fell heavily and did not get up.

Panicked, the neighbor had told the 911 operator that the woman had been shot; send the cops. Hardy happened to be the one who answered the call.

She had been babbling as Hardy raced up onto the porch. Not yet aware that she had suffered a stroke, he was trying to grow eyes in the back of his head. Where would a gunman be? Was the growth of weeds in the vacant lot two doors down thick enough to hide someone? Could someone be crouched inside one of the open windows in one of the houses along the street?

Backing across the porch, with one hand on his pistol grip, he felt behind him with his other hand for the woman. If she had been shot, he'd have to try to shield her from further fire. Glancing quickly at her, he saw no wound, but it could just as easily be on her back.

Seeing no immediate threat, he turned to the woman. As he reached out to her, she began to speak, "*Oo-sonay . . . nonay.*"

Her mutterings were stirring his memory, but as yet he couldn't give it his full attention. He still was not sure that there wasn't a gunman drawing a bead on the back of his head. He half-turned, still in a crouch, giving the quiet street another inspection.

"*Saynay!*"

He turned back to the woman, frowning in confusion. Snatching his radio, he demanded the status of the EMS call. After being assured that they were on their way, he turned his attention back to the woman.

"*Hundaday! Hundaday!*"

That one he remembered. A sudden flash of memory—the open eyes of a man, now dead, staring sightlessly into the rain.

Behind him, he heard steps approaching. He spun on his heels, reaching for his pistol. All he saw was a woman; the neighbor.

"Easy, officer. Didn't mean to scare

you that way. I overreacted when I saw her fall. I don't think she was shot after all. After I thought about it, I remembered that she had a history of medical stuff."

"Good," Hardy grunted. "I didn't want to end my week with a shooting."

The woman came and stood at his shoulder, the old, weathered boards of the porch groaning slightly as she stepped on a loose one. "What's that she's saying?"

Hardy shook his head. "I don't know."

The old woman had subsided into an uneasy muttering. "*Hundaday . . . hundaday . . .*" Her eyes fluttered, but did not open.

"That's spooky. It almost sounds like she's trying to say something," the neighbor observed.

"*Oonanay.*"

Hardy nodded, but did not say anything. The EMS van arrived quietly. The emergency lights were flashing, but the siren was silent. The driver peered out the window at Hardy, his facial expression clearly asking if it was safe to get out.

He gave the driver a thumbs-up sign and turned back to the old woman. In seconds, the paramedic was beside him. Listening to her muttering for a moment, he said, "Another one of those, huh?"

Hardy turned to him. "Another one of what?"

The paramedic gestured at the old woman. "I've had a couple of others like this. When they start this speaking in tongues business, it's generally a bad sign. They usually don't make it."

Hardy's eyes narrowed. "Because they're talking like that?"

The paramedic shrugged. "Just an observation."

"No offense, but I hope you're wrong."

"Yeah, me too."

Hardy lived alone in a small rented house that didn't suit him. The house had a used-up feeling about it that was vaguely depressing. He kept meaning to move, but never seemed to get around to it.

One thing that he particularly missed was air conditioning. The house soaked up heat during the day and released it at night, like a brick oven. To combat this, Hardy had a fan propped in the window in the kitchen. Its steady thrumming filled the air and made the house feel less empty.

As the fan labored to blow the excess heat from his cooking out into the twilit back yard, Hardy scooped the hamburger patties out of the frying pan. Picking up the plate, he went to the table.

An old black and white television was flickering and muttering in the corner. Just background noise; like the fan in the kitchen, it kept him from being so aware of his basic loneliness.

The sitcom ended, giving way to a rerun of an old cowboy and Indian movie. A mute indicator of the American psyche cycling back to a fifties mentality as the century drew to a close.

The sound was turned down, but Hardy could hear the stilted monotone of the Indian chief as he rambled through a stereotyped speech about the buffalo and the sky and the hills. The sight of the man's face brought up the memory of the people speaking what had sounded like some sort of Indian language.

Speaking in tongues, the paramedic had called it. That sounded almost religious. Could it be that there was a new cult religion that he had not heard about?

He frowned. It would not be all that difficult to imagine a church based on, say, peyote, where the practitioners learned some native language in order to chant or sing along during whatever rituals they performed. They would not necessarily even have to know the meaning of the words; how many Catholics knew Latin anymore?

What if the man in the Toyota had been given a slow-acting poison? The possibility of peyote being involved dovetailed nicely with his idea about a poison. What if the peyote buttons themselves were poisoned?

Leaving his half-finished burger on his plate, Hardy went and retrieved his notebook from his jacket pocket. He flipped through it for a moment until he found the name of the man's widow, Jean Thrasher.

He dialed the number. She answered. She sounded weary. "Hello?"

"Mrs. Thrasher? This is Amos Hardy, the officer who . . ."

"I remember you, Mr. Hardy. What can I do for you?"

He took a deep breath, hoping desperately that he wasn't on a wild goose chase. "Do you have a moment? I'd like to ask you a question or two."

She gave a tired, derisive snort. "I have nothing *but* moments. My life is pretty empty right now."

Hardy swallowed hard. "Was your husband . . . was he into any kind of religion or mysticism?"

"Mysticism?" Jean asked, her voice taking on a frosty edge. "You mean like Eastern people sitting around smoking hash and that kind of thing? I should say not. My husband was a Baptist."

Hardy squeezed his eyes shut, trying to force down a feeling that the conversation was going badly. "I was just wondering if . . ."

Her voice moderating, she said, "I'm sorry, Mr. Hardy. That was uncalled for. It's just that this has been hard."

"Yes, ma'am. I know."

"You do?"

"It's hard to adjust to losing someone you care for. Especially if it comes with no warning—no time to prepare. In your case, you have Jeremy to look after, too. Sometimes it's hard to understand how these things come about."

"The Lord gave me my husband, and when the time came, he took him away. I'm afraid I just don't quite know the reason why."

Hardy sighed. "We never do, ma'am. There just comes a day when they're gone and we have to cope, somehow."

"I'm glad you understand. Some folks seem to expect me to just shrug it off." She sighed audibly over the phone lines. "For some reason I get the feeling that this is related to the question you asked me at the hospital about Indians."

"Yes, ma'am, it is." He debated for a moment as to how much to tell her. "I ran across another case where someone was speaking much the way that your husband was . . . um, after the accident. It just made me wonder, that's all."

"You were thinking that my husband was part of . . . a member of a cult, weren't you?"

Since the idea seemed to offend her, he was reluctant to go into it any further. Also, he did not feel that it was proper to discuss the idea that her husband might have been poisoned. He was about to give her an evasive reply when she seemed almost to read his mind.

"You were thinking that my husband might have been killed. Poisoned? Is that it?" She lapsed into silence for a moment before speaking again. "There was that fellow Jones who gave cyanide to all those people . . . in the Kool Aide." She gave a small laugh, but did not sound amused. "John used to make a joke about it being *Kill* Aide that they drank. Oh, he had a strange sense of humor, sometimes. I'll miss him."

The way that she had cut straight to the heart of his theory chilled Hardy. He had hoped to spare her his ugly suspicions. "I don't have any evidence that that's what actually happened, ma'am."

He could almost hear her wry smile. "I would like to think not. Like I told you, we were . . . I still am . . . Baptist. It's very important at a time like this that I have the Lord to lean on for strength."

The conversation wound down quickly after that. After he got off the phone, Hardy went back to his remaining burger—cold now. Out of the corner of his eye he watched the cowboys kill the Indian chief. Shot while riding his horse—feather headdress remaining improbably perched on the man's head as he fell to the ground. He had turned the sound all the way down before he had called Jean, so he was spared the chief's dying speech, no doubt full of pompous phrases put into halting red-man-speaking-paleface-tongue.

Speaking in tongues and dying Indians. There had to be a connection.

Unwilling to give up, Hardy checked around over the next few days. No, Thrasher had not been poisoned. Hardy hadn't really expected it to be the case, but felt that it was an angle that should be checked.

Finding out about the old woman's religious convictions turned out to be more difficult. She had lived alone and there was only one surviving relative—a daughter in Spokane, Washington, who never seemed to be home to answer his call.

After four days, he finally reached the daughter . . . and ended up more confused than enlightened. The old woman had been a fervent follower of one of the televangelists. One of the ones who spent large portions of his air time begging for money. The fact that the man was under investigation for fraud had not deterred her from sending him at least two checks a month, sometimes more. An average month's donations might total over three hundred dollars.

To the daughter's knowledge, there had never been any contact between her mother and the evangelist's staff, other than through the mail.

Hardy sat back and stared at the ceiling, trying futilely to make the pieces fit together. One man, a devout Baptist, dead of complications resulting from injuries sustained in a car wreck. One woman who had died of a stroke—who had thought enough of a televangelist to send him what, for an old woman living on a fixed income, were truly large sums of cash. But they both had died speaking nonsense phrases.

Logic dictated that it was too tenuous a link upon which to build a theory. They were both delirious at the time and he was simply overreacting to a chance similarity to sounds they made as they were dying.

But his instincts insisted that the man had been coherent after the wreck. And the paramedic had indicated that he had seen others.

His next step was to call the paramedic, but the man could not add anything substantive to his knowledge. He had been too busy at the time to sit back and analyze what they had been saying.

A week passed before Hardy got another piece of the puzzle. He overheard another officer mention a heart attack victim. From the things the officer said, Hardy gathered that the man had been speaking nonsense just before he died.

Hardy had quizzed him closely, trying to find out what he could remember of the incident. He could not remember what had been said—it was gibberish to him—but he agreed with Hardy's description of the rhythm. That had made an impression on him, even if the actual words had not.

Hardy had nodded, eyes narrowing as he sensed that he was on the trail of an elusive truth. "Do you know anything about his religion?" he had asked.

The other officer had tipped back his hat, mopping at early July sweat with his sleeve before dropping the hat back into place. "Yeah, it seems to me he was, let's see . . . oh! That's right, he was a priest, for Christ's sake."

Convinced that religion was the link, Hardy was still unable to reconcile the differences *between* the religions. He remembered trying to squeeze a drop of mercury under his fingertip as a boy. Wherever he put his fingertip—that was suddenly where the mercury was not.

So how do you catch a drop of mercury?

Easy. Get enough of it in one place so that you can dip your hand in and scoop out a handful at a time. Lots of drops.

Where to find religion? In a church, of course.

The pastor of Thrasher's church had been more than willing to talk to him. However, the man clearly did not take him seriously when he sketched the outlines of his theory of religion being the common link between the deaths. The pastor told him that, although there were times in the past when people reported being spoken to by angels or gods, modern theology had no place for such things. He implied that Hardy might find his time better spent if he directed his questions to a psychologist or psychiatrist.

Hardy had then thanked the man for his time and left. The mercury drop had eluded him again.

The alarm was going off.

Hardy reached over and swatted at the clock. The alarm kept going. He pawed at it again—in vain.

Finally, his eyes came into focus and he saw the glowing digits clearly. It was 2:44 and the alarm wasn't due to go off for another three hours. It was the telephone ringing.

Groaning, he reached across and picked up the handset. "Um, hello?"

"*Oosonay hundaday. Shonay shonee.*"

"*What?*" he demanded. He recognized the intonation immediately. "What do those words mean? Please tell me what they mean!"

"I don't know," came a woman's voice. "I thought I was awake, but I must have been dreaming. I heard words like that. In my . . . dream . . . they made sense, but now I can't remember."

"Jean? Is this Jean?"

"Yes. I'm sorry if I woke you up, but I was afraid that if I waited until morning I wouldn't be able to remember what the words sounded like."

Hardy pushed himself upright in the bed, groping for a pillow to push behind his back. "Wait a minute. Let me get this straight. You were asleep and . . ."

"I thought I was awake—I've had a lot of trouble sleeping since John died—but I must have dozed off."

"Can you remember what was happening in the dream?"

There was a long silence on the line. Then she said in a small voice, "Amos, I think God was speaking to me."

Goose bumps rose on his arms. Every time he had heard those words, the person speaking them died soon thereafter. "Jean, do you feel OK?"

She gave a small sigh, reading his mind again. "I'm upset, but I don't think I'm dying, if that's what you mean."

"Good. See to it that you stay healthy. There's something going on here that I don't understand."

"That makes two of us."

"Can you remember any other words, Jean? This might be important."

"No. It's all fading now that I'm awake. That *was* what my husband was saying, wasn't it?"

"Something very much like that, yes," he assured her. "I remember that *hundaday* thing, in particular. I just wish I knew what it meant."

"I'm scared. Nothing like this has ever happened to me before."

"Why should you be afraid if God is speaking to you?"

" 'Fear God, and keep his commandments: for this is the whole duty of man,' " she quoted. "The Lord I know is not to be trifled with, Amos."

"Jean, I'm not a religious man, so I can't pretend to understand these things, but it seems to me that if you spend your whole life worshiping God, then you should be glad when he actually notices you and speaks to you."

There was a pause as she decided what to say. "Amos, I am a sinner. For God to take notice of me is a fearful thing."

Feeling that he was treading thin ice, Hardy said, "I don't want to pry into anything personal, but have you, like, murdered anyone? I mean, have you been especially sinful, that you have to be this afraid?"

"Amos, I was *born* in sin!"

"You were illegitimate? That's nothing . . . happens all the time."

"Original sin, Amos."

"That's something I've never understood. It's not like it's something that you did, personally. As far as I'm concerned, a person begins with a clean slate. It doesn't make sense to hold somebody responsible for something that happened before they were born."

"You don't understand," she said simply.

"I'm afraid not," he admitted quietly. He took a deep breath and let it out slowly. "Listen, I'm not trying to criticize your belief—I just don't understand. OK?"

"I see that. But can you see that it scares me to even talk about it? God knows everything I do. I may even be doing wrong by telling you about my dream."

"I hope not, Jean. It may be important to our understanding of what is happening."

She did not reply to this immediately. After a minute had passed, Hardy ventured, "Jean?"

"I'm here. I'm just trying to imagine the consequences if I have done the wrong thing by telling you this."

He wanted to tell her to cheer up; not take such a gloomy view, but knew that to her this was a serious issue and that he should not make light of it. "Jean, was there anyone else in your dream?"

He could almost sense her shaking her head. "Not that I remember. Just me and . . . Him. Listen, I'm sorry I woke you up. I'll call you in the morning if anything else happens. Good night." And without even waiting for him to say good-bye, she hung up, leaving him holding a telephone to his ear in the dark.

"Good night," he said uselessly, and placed the handset back in the cradle. For a long time he sat there thinking about what she had said, trying to find the loose end of string that would allow him to unravel the knot. When he finally lay back down to try to get an hour's rest before the alarm went off, he was no closer to solving the riddle than he had been before.

Hardy had been trading favors, working odd shifts for people so that they would work for him later in the summer. This would allow him to take a longer vacation. Now he was on the verge of cashing in and taking off from mid-August through Labor Day. A little over a week from now, he would be the master of his own fate—at least temporarily.

A monster of a thunderstorm was raging as he turned into his short driveway. He sat for a moment listening to the drops slam against the roof of the car.

Three times he almost opened the door, feet primed to make the mad dash to the front porch, but the rain, sensing his intent, picked up each time, pounding so hard that Hardy began to wonder if hail were mixed with the rain.

Finally, there was a short lull. Pushing the door open, he splashed his feet onto the driveway, spun and slammed the door shut just as thunder crashed, loud enough that he could feel it in his gut.

He sprinted to the front porch. There was a small overhang in the roof that kept the rain from drilling straight down the back of his neck, but the wind was blowing the drops sideways in such volume that he was getting thoroughly soaked, anyway.

Quickly, he fished out his keys and unlocked the door. He slid inside and pushed it shut against the wind, then stood dripping on the old, wooden floors.

The phone was ringing. He hesitated, not wanting to track water and mud on the way to the phone. Just as he decided to go ahead and make a mess anyway, the phone quit.

Cursing Hardy slid out of his jacket, hanging it gingerly over the doorknob. He sat on the floor and started to remove his shoes just as the phone began to ring again.

"*Dammit!*" He quickly jerked his shoes off and ran in his socks. "Hello!" he said quickly, as soon as he snatched the phone off the hook.

"Amos? It's Jean."

Grinning in spite of his irritation, he said, "Jean, we've got to stop meeting like this."

As soon as he heard the tone of her voice, he regretted being so flippant. "Amos, I'm scared."

"Scared of what, Jean?" It had been over a month since she had called him in the middle of the night. He had not heard a thing from her in the meantime.

"I'm still hearing those words. Either I'm going insane or—"

"Or God is taking a *very* personal interest in you," he finished for her.

"Please don't say it that way," she pleaded.

"I'm sorry. It's just that I don't understand the rules, Jean. I have a hard time being so serious and fearful all the time."

"I know. In a way, that's why I called you. I need someone who has an unbiased opinion."

"I'm not sure my opinion qualifies as unbiased."

"I tried to talk to my pastor about this situation. He as much as told me that I had been under too much strain, what with John's death and all, and that maybe I should check myself into the hospital 'for a rest.' I was counting on him to be more supportive than that. The way he talked, it sounded as though I was not competent to handle my own affairs. He implied that I ought to consider giving Jeremy up for adoption."

Hardy nodded. "I can see where that would be insulting."

"So I thought to myself, 'Jean, if the people who are supposed to be the most knowledgeable and helpful about this sort of thing aren't doing any good, who can you turn to?' You seemed to believe me, even if you aren't sure what's going on, so I thought perhaps I should call you to get a second opinion. I'm asking you a direct question—am I going crazy? Should I give up Jeremy?"

"Whoa, whoa! Slow down, now. I understand that you're upset, but I don't think it's *that* bad." He paused to collect his thoughts. "Listen, if I hadn't heard your husband and a couple of other cases, I might be a little more likely to brand you as a nut case, but there's no doubt in my mind that there's something going on." He snorted. "Hell, I asked you first, remember? Back when we were sitting in the hospital just after your husband's accident."

"Don't say that."

"Don't say what?" he asked, confused.

"That word."

He thought back over what he had said. "Oh, sorry."

She sighed. "It's all right. I realize that I'm a little conservative about these things. When I think about some of the words they say on television, it makes me wonder what the world is coming to.''

''The end?'' he replied jokingly, then bit his tongue, wishing that he had not said the first thing that came to his mind.

''Perhaps,'' she replied quietly.

''Hey! I wasn't being serious, for God's sake . . . oh, crap . . .'' he stuttered to a halt.

She surprised him by bursting out laughing. ''It's OK, Amos. It's not like I can rain hellfire and brimstone on your head, you know. I realize that you probably use those words every day when I'm not listening. If God hasn't struck you down yet, I doubt that He will choose to do so at this particular instant.''

Just at that moment, lightning lit the windows, turning them bright blue-white. Thunder hit like a physical thing before Hardy's mind could even register that lightning had struck, seemingly in his back yard. The phone line crackled and popped with a sound like gunfire.

''Amos? Are you OK?''

''Wow! That was close. Yeah, I'm fine, but I'm not sure my heart would agree—it's going a mile a minute.''

''I thought . . . I thought . . .''

''It's OK, Jean. Either it was just a warning, or God is a terrible shot.''

He thought he heard what might have been a suppressed giggle. ''Oh, *please* don't say that.''

Feeling obscurely pleased that he had amused her, Hardy said, ''How are things in general?''

''I was numb for a while, but now I think I'm waking up to the fact that John's not just on a trip somewhere—it's permanent.''

''I'm sorry. I wish that there was something I could do.''

''You are doing something. You're not acting as though I'm crazy.''

''Jean, if this goes on much longer, *I'll* go crazy.''

Two days later, a green 1978 Ford station wagon plowed under the back of an eighteen wheeler at a stoplight. The driver didn't make it, but the passenger was still alive when Hardy arrived at the scene.

In retrospect, he should have expected it, but he still did a classic double take when he heard the teenaged boy moaning under his breath, over and over again, ''*Oosonay . . . oosonay . . .*''

The next day, Hardy checked and found, much to his surprise, that the boy was still alive. He dropped by to see him at the hospital on the way home after work. Swathed in bandages down his left side and drugged to control his pain, the boy made a valiant effort to recall what he had been saying, but was unable to help.

Frustrated, Hardy left. More than anything else, he wanted someone he could talk to about what was happening, but it seemed that most people had not noticed anything; the ones who had seemed reluctant to talk about it. So far, Jean was the only person who was willing to face the situation, but she was terrified by the implications. The idea that God was taking a personal interest in her seemed to unnerve her.

In a way, Hardy wished that he could feel religion as Jean Thrasher did. It was clearly a great comfort and guiding principle to her. On the other hand, wondering if she was going insane was hardly a settling influence in her life. It seemed, at least in that sense, that her religion was failing her; having exactly the opposite effect that it should have.

Hardy grunted to himself as he drove across Gervais Street, vaguely aware of the cars pressed against either side of the intersection, waiting for the light to change.

His shift had been uneventful, for the most part. This left him free to worry and tug at the edges of the speaking-in-tongues mystery. Foremost in his mind was the persistent question of whether there actually *was* a mystery. If he viewed it logically the whole thing fell apart in his hands like a broken eggshell. On the other hand, his instincts insisted that he had *not* been imagining things, that there was an underlying pattern to the words that he had been hearing. That left the very annoying question of exactly what the pattern was. That question seemed to be all but unresolvable without more information.

It seemed that religion was the common denominator. That and death, or at least a highly stressful situation, if you counted Jean and the boy in the hospital. But the religions were not the same. There was no obvious link between a televangelist and a local Baptist church. Nor was there any way he could see to tie in the Catholicism of the priest who had suffered the heart attack.

Suddenly, Hardy banged the steering wheel with the heel of his palm. "Dammit!" he muttered.

He had forgotten to ask the boy about his religion, if any. That was dumb. How could he have missed checking on such a simple and obvious point? Hardy shook his head. He had been too interested in the meaning of the words and had neglected to get the background.

Stupid. Inexcusable.

Without thinking, he turned at the next intersection, making his way towards Elmwood, the nearest major traffic artery. From there, it would be a simple matter to get to the hospital and drop in on the boy. Then he could get answers to his questions.

On any given day of the week, Elmwood is heavily used, serving as it does, not only as a major street in the downtown district, but also as one of the two major options for I-126 entering the city.

Hardy noted the delivery truck on some lower level of his mind as he castigated himself for forgetting to ask the boy even the most rudimentary questions about his background, but it wasn't until he saw the grill of the truck looming over him that he remembered that the traffic light, for him, was red.

Helluva way to treat a guy who's hurt.

First they had bandaged him to the point where he was hardly able to move, then they had drugged him, leaving him awash in a muzzy, half-aware state that allowed neither linear thought, nor the oblivion of sleep.

Hardy cast about, trying to find an appropriate analogy for his present state. Adrift? No, that left begging the question of what he was adrift *in*. Flying? No, that was even worse. He had no sensation of movement, and no wings, either.

How about a comparison with an animal? Just a sort of primal awareness, without the sharper perceptions that would distinguish his state from that of some higher being. It allowed for the pain, which was still with him in spite of the drugs.

Hardy lay for a while trying to determine which animal he might be, but the frustrating answer always came back: *human*. For as far back as he could remember, he had always had a peripheral awareness that man as a species was classified with the other animals. Insulting in some ways, but there it was.

His heart beat like other creatures'. His arms and legs articulated in much the same ways. Even his brain, although arguably larger and more sophisticated, functioned in similar ways to those of the other animals.

Did they not feel pain? Did they not worry, after some fashion, about their lives? Surely, he felt pain and, even through the drug-induced fog, felt anxiety over his future.

In a stream-of-consciousness sort of way, Hardy puzzled his way around the issue, feeling that there was something central here. There were questions to be answered, if only he could cut through the fog and have the clarity of mind to ask them.

But who would answer?

"*Hundaday*."

Part of Hardy was immediately terrified, but another part of him grasped at the single word as though it were a lifesaving thing. On a deep, intuitive level, he finally found the word's meaning. The word meant I am, or I will. It was an imperative assertion of the self, meant to express presence and support.

Mentally, Hardy probed the texture of the cotton surrounding his thoughts. There was someone else in his head and he wanted to find out who it was. His thoughts, however, were blunted, dull instruments, unable to pierce the haze and see the face of the one who had spoken.

Even as he was searching, he was trying to fit the word *hundaday* into the contexts where he had heard it before. Now that he knew its meaning, it made some sense. A dying man might shout it as defiance of death: I exist . . . I dare darkness to take me. He might also use it to try to communicate to another that he now understood some truth, and was willing to impart it if only the bystander would ask the right questions.

With that insight, Hardy realized that, in an analogous manner, he could ask of the voice any question. He could finally find out what the link was between John Thrasher, the old woman, and the others.

How comforting! Just to know that answers existed was a relief beyond imagining. He was tempted to hand over responsibility for his life to this nebulous other. It was almost enough just to know that there *were* answers; that life was not an unfathomable mystery after all.

Almost, but not quite. Hardy could not rest comfortably on the knowledge that answers existed. He had to know the answers. Faith, for him, was not enough.

He stopped probing the recesses of his mind and adopted a different strategy. Perhaps baiting a hook would draw the other to him.

But what if it was God?

Jean seemed convinced that the voice she had heard was God. Exactly how she knew that, Hardy wasn't sure. Surely you couldn't just walk up to God and demand to see some identification, as though you were going to arrest Him.

For that matter, how would you know the documents weren't forged. In theory, God could snap His fingers and create any kind of proof you wanted.

But wouldn't that ability alone suffice to identify God? Who else could conjure identification out of thin air? For that matter, exactly what kind of identification would God carry. . . . He certainly wouldn't need a driver's license.

Bemused, Hardy sank back into the haze in his mind and pondered the problem. It was a measure of how slow and drugged his thinking was that it took him so long to come up with the answer. An answer in the form of a question . . . just like a game show.

"Who are you?"

"*Hundaday.*"

Indeed, it was an answer of sorts. Since the word meant an assertion of self, it was equivalent to saying I am. Vaguely, Hardy seemed to recall that God had been quoted as saying something of that nature. But, Hardy reflected, it hardly sufficed as a complete identification. Oh well, it's not like he was in a position to arrest anyone, anyway. Especially God.

"What do you want with me?"

"*Hundaday huedodo doonay.*" The words rolled over Hardy in waves. Sonorous syllables that he could feel all the way down to his medulla.

The sentence was without syntax. Each word was a discrete unit of meaning that took only minimal notice of its neighbors. Essentially, once the meanings were added together, they meant that God had a message for him.

The implications took a moment to sink in.

"Wait a minute! I'm not a preacher! I'm not sure I even *believe* in you! How can I be the one to deliver a message?"

"*Woonay sadee oosonay. Saysoon wayonay ha noteehah shonay shonee. Oosonay hundaday . . .*" This time the words did not stop. Soon Hardy began to wish that he had somewhere to hide. This truly was a terrible thing, to be burdened with Truth, and expected to deliver it to the masses.

Especially a truth that would destroy organized religion.

Hardy was haggard when he awoke. For a long time, he lay listlessly, simply listening to the sound of his own breathing.

Then the door to his room opened and Jean slipped in quietly. "How are you feeling?" she asked.

He turned his head slowly to look at her. "What brings you here?"

"I called your house and got no answer. I called the station and they said that you had been in an accident. They wouldn't tell me where you were, but it wasn't difficult to find out. There aren't that many hospitals in town."

He nodded weakly. "I see. Well, have a seat. Let's see if what I remember of my dreams matches what you remember."

Her eyes opened wide. "You . . . ?" she began, but could not find the right words to complete the question.

He nodded again. "Listen, can you crank up the bed or prop up my head with pillows or something? We need to talk."

"So I'm not crazy, after all," she

said as she moved to obey.

"I never said you were, Jean."

It took time to piece the fragments together. Hardy had been overwhelmed by his first contact with the voice. Jean had had enough time to absorb the awful implications of the first message and had gone on to delve more deeply into the matter. Hence, she did most of the talking.

"You realize that this is very hard for me? The idea that one of the fundamental forces in my life has not only been based on wrong information, but that it is soon to withdraw, is very difficult for me to face." She sat quite still, face pinched, with her hands in her lap. She reminded Hardy of nothing so much as a schoolgirl reciting her lessons.

He nodded. "I can guess. The implications are staggering, even though I'm not religious. For someone who *is* religious, it must be shattering."

She nodded in turn with jerky motions of her head. "It's . . . rough. I've wanted to tell you for several weeks now, but I just couldn't bring myself to do so. Now that you know part of the story, maybe that will make it easier."

He smiled grimly and gestured at the bed. "I'm not going anywhere, so you have a captive audience."

She made a wry expression. "I've had . . . time on my hands since John died. I took the liberty of going to the library and reading up on some of the background. I graduated from college with a degree in history, so some of this is second nature to me, although I never thought I'd be using the knowledge in this way."

"The benefits of a college education," Hardy muttered under his breath.

Jean heard him and grinned mirthlessly. "Don't laugh, I may need that degree yet. I've been considering going into teaching to help make ends meet. The insurance money won't last forever." She shook her head. "At any rate, I'm sure that you probably know as much—or as little—as I do about the nature of the being whose voice we've been hearing."

Hardy shrugged, then winced. "I don't know if we've been talking to the same . . . uh, god. I mean, how do you tell? He wouldn't tell me anything about himself."

"In a way, that's what I mean. He will answer nearly any question I put to him, except about himself. Very secretive."

"Reminded me of *The Wizard of Oz*. 'Pay no attention to the man behind the curtain,' and all that."

She grinned at him, relaxing by some small fraction. "I hadn't thought of it in those terms, but you're right. This voice doesn't encourage familiarity."

"To think that you'd speak of God that way," he teased.

She winced. "I wish you wouldn't put it that way. I'm still having trouble adjusting to this."

"I'm sorry. Why don't you just start at the beginning and I'll keep a respectful silence."

"From what I've been able to piece together, the ancient Greeks were closer to the truth than our modern Western conception of a monotheistic religion. There really are multiple gods . . . and capricious ones, at that. In the library, I found estimates of the human population circa 500 B.C. It looks as though there were about 120 to 125 million people in the world. From things that . . . God. . . ." She looked at Hardy apologetically. "I'm sorry, but I don't now what else to call him. He won't give me a name."

"You could call him *Hundaday*," Hardy suggested.

She shrugged. "Maybe so, but that doesn't come easily." She sighed. "Anyway, from things that *Hundaday* said, I've inferred that he is a member of a race of . . . aliens, I guess, who are telepathic. They seem to watch over us as a hobby or something."

Hardy frowned. "I got the impression that it was more like a sport. Something they do for fun. Almost as though teams of these aliens were assigned to each human and that they would play us off of one another. To complicate matters, it was as though they were using us as bumper cars at the county fair—no rules, no guidelines, no real strategy. Just a wild free-for-all. Sometimes bad, but, to give them their due, usually neutral, if not good." He paused reflectively. "You know, in a way, I can see how it might be fun if you had that kind of power."

She blinked at him. "*Amos!* That's no way to treat people! Of course, there's no way to tell how *they* feel. I'm sure that it's quite different from the way that we look at things." She sighed. "Anyway, as near as I can tell, there used to be two or three aliens for each human. Not exactly guardian angels, but if the group acted together, then they had enough strength to produce what we would call miracles. Humans saw the interventions and attributed them to gods. However, they had no way of telling how many cooks were stirring the pot, so they invented entirely too many gods—dozens, when really, each person might need only two or three names for their own, personal gods. Their 'team,' as you might put it."

"But there would have been two or three names for each human," Hardy pointed out. "If I had gods named Larry, Moe, and Curly, there would be times when I would want to talk about your gods. Then we'd be talking about Harpo, Groucho, and Chico. There would have been an awful lot of names to keep track of."

"That's why I looked up the population during those times. I wanted to get some idea of how many of these aliens there might actually be.

"If the population during the era of ancient Greece was about 125 million and there were two or three of these creatures for each person, that would mean that there were something like three or four hundred million aliens, total."

Hardy shook his head. "That's a lot of gods to keep track of."

"Yes, it is. Of course, the Hindus have about a zillion, maybe they knew something we didn't know. . . ." She shook her head. "Never mind. Anyway, partly due to their help, we flourished as a species. Our population grew much faster than theirs and the ratio of gods to humans began to drop. There simply were not enough to go around."

Hardy nodded. "This is the point where I came in. They're now running around frantically, futilely trying to stay on top of things, but the logistics of the game are simply overwhelming them. It's no longer fun because they can't get enough of themselves together on any one team to produce an honest miracle. And if they can't effect the destiny of the humans they're watching over, why play at all? It would take all the pizzazz out of the game not to be able to win or lose. Then it becomes more like a job—day-in, day-out drudgery, with no hope of ever getting ahead."

"Right. If my numbers are anywhere near accurate, there are now ten or fifteen humans for every alien, and there's no way they can keep up."

"So they're quitting."

She swallowed visibly and nodded. "I asked, why me, why now? *Hundaday* said something to the effect that he is . . . sort of a manager, maybe a referee, and that this was one of the areas that was the most taxing for them to sustain. Apparently, peoples' expectations factor into this somehow. I gather that it's more difficult to produce a miracle on demand."

Hardy nodded. "Well, there's a tendency for people to always want a bigger, better miracle than the last one. We've become somewhat jaded by the easy, ordinary miracles."

"And there are so *many* people in this region who are so very, very religious that the work load is even higher still," Jean added.

"The Bible Belt. Of course, we aren't the only state that can lay claim to that term. I imagine that there are other places that are in about the same situation that we are."

"I guess so."

"So they're going to quit the god business and go find another race to toy with. One that won't be so demanding. I almost felt as though there was a petulant undercurrent to what *Hundaday* was saying—if we aren't going to play right, they're just going to take their bat, ball, and glove and go home." He shrugged. "We're going to be left to fend for ourselves for the first time in history."

"It feels sacrilegious to say, but that's what it amounts to, yes."

Hardy thought for a moment. "It's not the kind of thing that you can just go out on the street corner and announce, is it?"

"I imagine you'd be lynched if you tried it around here. It's not something people are going to want to hear."

"Actually, I doubt that religion, *per se*, will die out. Most people don't seem to require any actual evidence of the existence of God in order to believe in Him."

She nodded. "True. *Hundaday* is getting the word out to as many people as possible, just out of a sense of fair play, but at this rate I'm sure that it will be a while before there are any significant results. Apparently it takes a certain frame of mind before he can speak directly to the human mind, since humans don't have any natural telepathic ability."

"Like an accident," Hardy said, gesturing at himself.

"That's what it took for John and for you. For me, it seems that the stress of losing my husband was enough to do the trick."

"*Hundaday* wanted me to be the one to stand on the street corner. I don't think I will. Even though religion has been slowly declining over the centuries as the ratio of aliens to humans decreased, I don't think that the time has come for someone to start proclaiming the end of religion as we know it."

"There are so many people who rely on one or another of the religions to guide them every day. Imagine how they'll feel when that's taken away from them."

"How do *you* feel?"

"Lost and empty. Like a kid who's just been told that there's no Santa Claus."

"If there's anything I can do to help, let me know."

"I will," she said, and stood. "I've been here past visiting hours. I need to go." She walked over to the door and stopped with her hand on the handle. "Can I come see you from time to time? You're the only person I can talk to."

"Any time," he assured her. "By the way, I think it would be wise to keep a low profile."

"Sad that it should come to that."

He shrugged. "We'll cope. Humans are adaptable. Who knows? It may all be for the best. Now we can find out what we're *really* capable of doing." ■

●If to talk to oneself when alone is folly, it must be doubly unwise to listen to oneself in the presence of others.

Baltasar Gracian

●The world was given to us to explore. No one man can ever visit all of it, but he ought to see as much as he can.

Lowell Thomas

THERE'S A BIMBO ON THE COVER

or

The Art Director's Fight Song

(Sung to the Tune of "She'll be Coming Round the Mountain.")

by Rowland Shew

There's a bimbo on the cover of the book.
There's a bimbo on the cover of the book.
She is dumb and she is sexy.
She is nowhere in the text. She
Is a bimbo on the cover of the book.

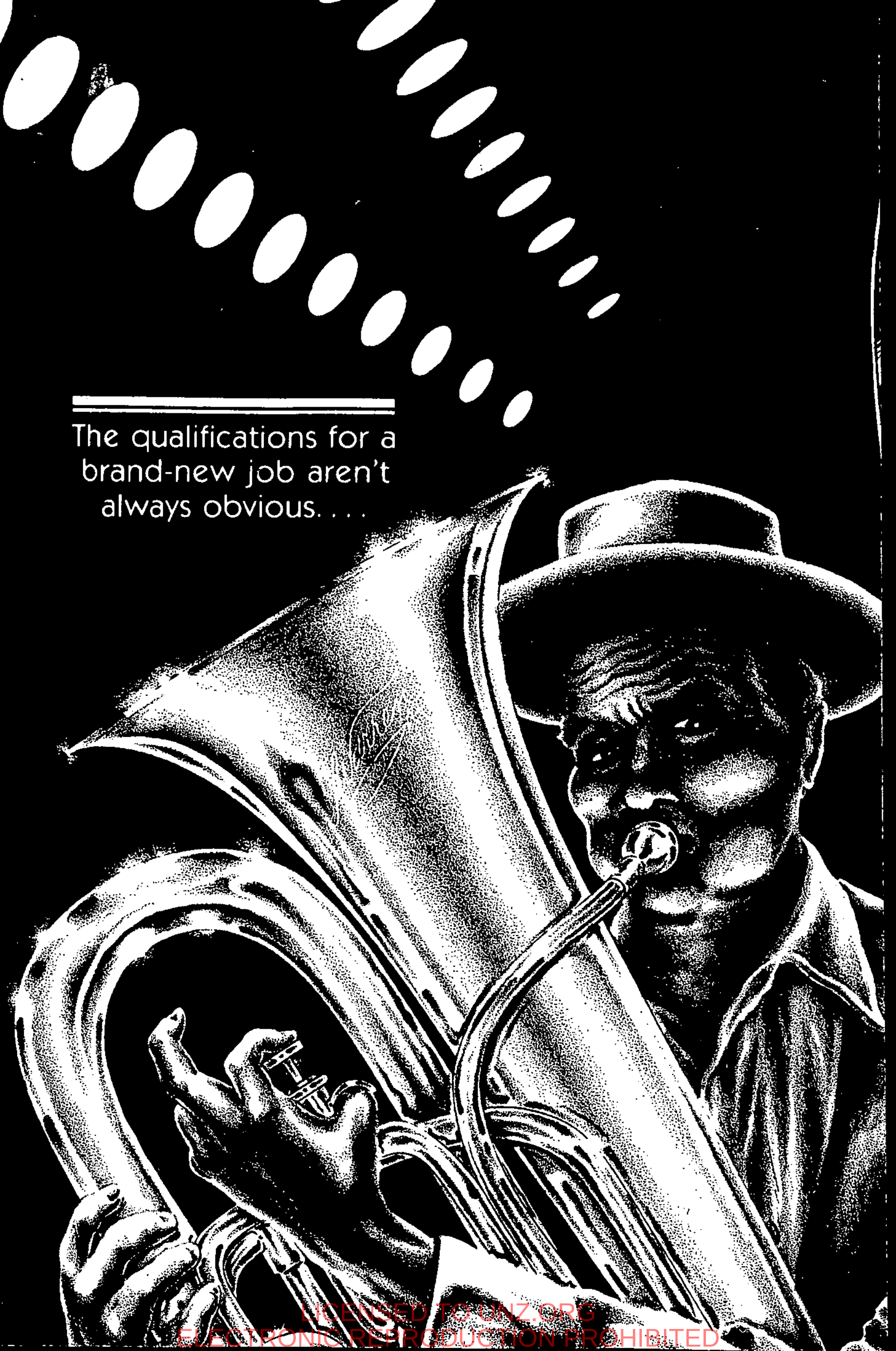
There's a white male on the cover of the book.
There's a white male on the cover of the book.
Though the hero*ine* is black,
With Art that cuts no slack.
So, there's a white male on the cover of the book.

There are death rays on the cover of the book.
There are death rays on the cover of the book.
It's a philosophical story,
But the cover must be gory.
So, there are death rays on the cover of the book.

There's a space ship on the cover of the book.
There's a space ship on the cover of the book.
The connection's very iffy,
But if the story's sci-fi*
There'll be space ships on the cover of the book.

There's a monster on the cover of the book
There's a monster on the cover of the book
He is mean and he is hairy.
Tho' the story's not that scary,
There's a monster on the cover of the book.

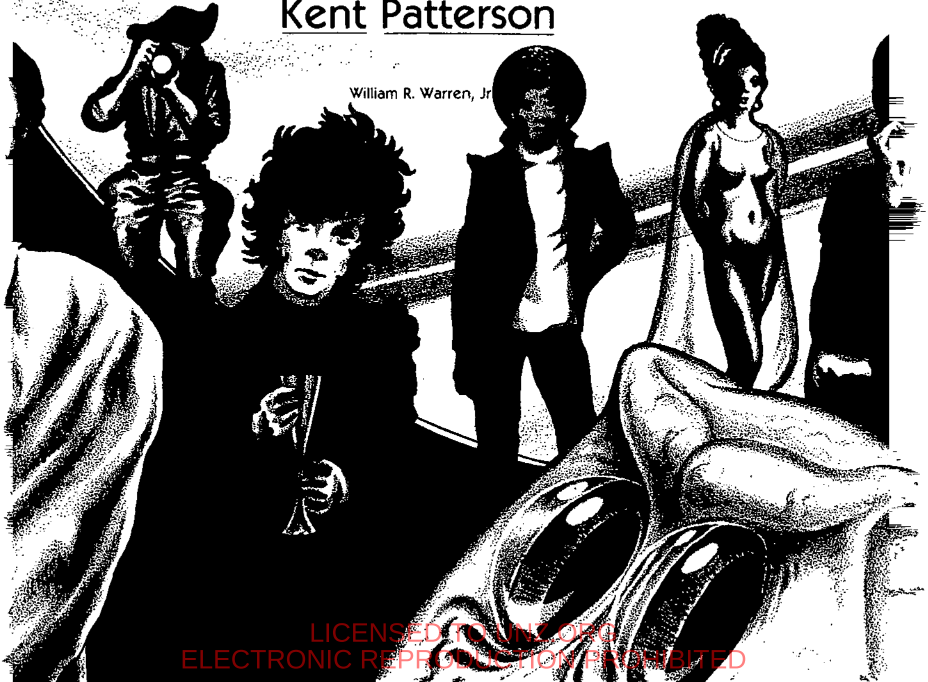
* Pronounced "skiffy" by the *cognoscenti*.



The qualifications for a brand-new job aren't always obvious. . . .

SOREN SORENSEN'S ONE MAN, ALL TUBA, ALL DANISH BAND VS. THE SHORT ET'S

Kent Patterson



William R. Warren, Jr

There were hardly any women in the audience, if you call two dozen drunken ice miners an audience. No women means trouble in a low dive, and the Ring Rat Lounge was lower than any Soren Sorensen had ever seen. Which said a lot because he'd played in Perth Amboy, New Jersey. The place reeked of urine and beer—not honest beer, but the chemicals that passed for beer in the Saturnian satellite towns.

The miners hadn't bothered to change their work clothes. They slouched around in hard suits like giant insects, or sat in their underwear. Across the back wall a poster showed an idealized—very idealized—ice miner with the slogan "Where You Go/For Your H_2O."

"Alien News Update" was on the wall vid. Soren had watched it faithfully for months, and he strained to hear. Against a background supposed to represent the cosmos, a pretty black woman talked about Earth's first visitors from outer space. They were incredibly advanced. Every government on Earth had been working to make a favorable impression on them, but they politely refused to choose a favorite. So far they had just visited Ring City, which was UN territory and neutral. Wouldn't you know it, Soren thought. Earth's first contact from outer space and they can't find a parking place.

What the ETs wanted, they said, was to study Earth culture. They invited all Earth artists to come display their best works. Soren had shot his bank account and spent six months cramped in a space freighter to do just that. But so far he'd never managed to get near an ET.

Someone turned the vid off.

Well, thought Soren gloomily, the ETs have to get along without us. Just as well. One look at the Ring Rat, and any intelligent ET would fumigate the place with a plasma cannon.

Soren opened his tuba case, then hesitated. He hated to expose such a beautiful instrument, with its precision valves, smooth metal curves, and the great golden bell, to such thugs. He glanced to his right, at Horst on accordion. The man had the sensitivity of a pig iron block. On the left, Katrina on electronic glockenspiel picked up her instrument and smiled as brightly as though the Ring Rat were a great hall of Europe.

Helmut Peters, band leader and manager of Peters's Polka Party, rapped for attention. Someone belched. "We want girls," shouted a large miner with a long black beard.

"Yeah. Show us some tits."

"So without further ado, we bring you the sound of Peters's Polka Party." Helmut marked the beat, Soren blew his first "om pah" of the evening, and the Polka Party launched into the snappy "Klara Klaffen aus Affenhafen" polka.

"Soren, pick up the beat!" Horst hissed. Blushing, Soren picked up the 2/4 beat. A one and a two, and a one and a two. The only Dane in a crowd of Germans, and it was always him off the beat. Maybe it was true. Danes had no rhythm. Especially North Dakota Danes. The kids in school had teased him. The Great Dane. Big, clumsy, Scandahoofian with fingers like ball bats. He should be plowing, or rowing a Viking ship, or swinging an axe. He was a clod, a klutz, good for nothing but labor and Lutheranism. Fiercely he scowled at his music, trying by sheer will power to force the notes off the page, through his brain, and into his fingers.

The tuba throbbed. "Om pah pah, OM pah pah." Even when he was six he'd loved the tuba's toe-tapping sound. Now twenty years later, he was playing professionally, even if it was a nowhere band. Now almost ready for the spine tingling "Jawohl O Ja" chorus. He could feel the vibration rattling his chair, warming his blood.

A beer bottle whanged against the bell of the tuba, knocking the mouthpiece against his lips. In an agony of fear, Soren looked to see if the smooth brass skin had been marred. No harm done. Thank god Saturnian beer bottles were soft plastic.

Only then did he notice the miners jeering.

"Kill the racket. We want girls!"

Another beer bottle clipped Horst on the shoulder. Enraged, he grabbed it and threw it back, whacking a miner right between the eyes. With a roar, the crowd, or as many as could stand, came for the stage.

"Run for it!" shouted Helmut, already disappearing through the stage door. Horst, the coward, thrust Katrina back and followed Helmut. Soren started putting his tuba back in its case.

A fist smashed into Soren's chest. A miner, head shaved, one golden earring, shook him as if he were a puppy. Soren felt helpless.

Someone grabbed his tuba.

"Let me go!" Soren begged.

"Fat chance." The big man laughed. "Smash that damned noise maker, Leo."

Smash his tuba! Rage flowed through Soren's veins, the kind of berserker rage his Viking ancestors would have approved. He brought his knee up into the groin of the giant holding him. The giant let go. Soren spun, kicking the miner named Leo in the kneecap. As Leo dropped the tuba, Soren slugged him, and caught the tuba an inch before it hit the floor. Protecting the tuba with his body, he ran through the stage door and slammed it behind him.

What they called streets in Ring City would be called hallways on Earth. Soren's hair brushed against the ceiling. Since the entire city was built in a gigantic wheel, walk far enough along any street and you'd wind up where you'd started. It took him an hour to find the Big Wheel Hotel, where the band had pooled their money to rent an "economy suite." Real economy. No lobby, no attendent. Just an automated doorkeeper with a keyboard and a screen.

Only when Soren stuck his mag cardkey in the lock slot, the machine ate it. He pressed the "?" key to find out why. The machine said the room had been canceled and the deposit returned to Helmut Peters. Soren cursed softly. He'd been swindled. The band had dumped him like an unwanted kitten.

Soren had zero on his credit chip, and $28 in the paper the Saturnians called money. He hadn't been paid for the Ring Rat gig. Fat chance of collecting anything now. Given Saturnian prices, he could get maybe a fake burger and a cup of even faker coffee. He'd have to find a place to sleep. He started walking.

Soren walked for two hours. Nearly

midnight. A siren wailed. Soren groaned. Ring City contractors turned the street life support to minimal requirements at "night." Every light went off.

Soren had never been in such darkness. The hard wall hurt his back. He tried laying down. Too cold. He huddled into a ball. Miserable.

It got colder. Once he saw the flicker of a flashlight. He'd heard cutthroat thieves prowled Ring City streets at night. They must be exceptionally stupid and unsuccessful cutthroat thieves to be out here, he thought.

The metal street sucked heat. Finally, he huddled on his hands and knees. After an eternity of shivering, he fell asleep.

Lights. Day at last. Soren tried standing up, but his cramped legs refused to support his weight. Here and there doors opened, with people rushing off to work.

"Must've been a great party," a man jeered, as Soren finally staggered to his feet. He picked up his tuba. Even fake coffee would taste great this morning. He reached for his wallet.

Gone! Frantically he searched his pockets. Empty. ID card, credit chip, ring permit—all he had in his pockets was lint, and not much of that.

For the next few hours, things only got worse. He stopped at a police station to fill out a robbery report, only to be told that sleeping in the streets was illegal. The unemployment bureau wouldn't take a job application because he lacked an ID, and anyway the only jobs available were in things he'd never even heard of.

By noon, he felt he'd spent half his life trudging up and down the steel streets of Ring City.

On Earth, street musicians sometimes could make a living. Here, though, there wasn't even a sidewalk. Choosing a crowded intersection, Soren put his hat down in front of him, picked up his tuba, and played "Muss I denn." He'd barely reached the second chorus when a cop ordered him to move along. When he looked for his hat, it was gone.

By now the streets swarmed with people. Not ice miners, but nicely dressed people, and school kids in long lines with their harried teachers snapping at their heels.

Of course. Today was the reception for the ET ambassador at Crystal Plaza, the great observation hall located at the hub of the Ring City wheel. Most of the population of Ring City would be there. He'd come half way across the Solar System to be there himself. Now he didn't even have an ID or a ring permit. If security checked him, he'd be in deep, deep trouble.

But then he was already broke and hungry. What did he have to lose?

Soren followed the crowd along the spiraling corridor which climbed through one of the wheels "spokes" through zones of weaker and weaker gravity to the central hub.

Abruptly, the corridor ended. Stars shone beneath Soren's feet. The Plaza, called the "Fish Bowl" by the locals, was a great transparent globe nearly a hundred meters across. The crowd surged on, leaping like gazelles, taking advantage of their low weight. Gingerly, Soren stepped out. Beneath his feet, he saw the vast circle of Saturn. Above, people clustered like flies on the transparent ceiling.

Through the ceiling he could see the administrative offices, a smaller but faster spinning wheel which sat above the Ring City hub and was accessible only through a long flexible shaft. That's where the reception would take place. Strictly off limits to mere mortals.

Then, in the distance, he saw the ET ship. Enormous. But Soren was disappointed. There wasn't a light, or a porthole on the entire ship. It sat in space, looking like a great lump of coal gleaming fitfully in the dim light of Saturn.

The crowd hushed. Not a good place for a street musician, Soren thought, but where on this big tin wheel was there a good place? He picked up the tuba. Anyway, even if he got sent to jail, they'd have to feed him.

He started with "Muss I denn." The plaintive sound reverberated from the ceiling, filling the whole Fishbowl with its "Om pawm om, um pawm om." The crowd, evidently thinking this was part of the reception, listened respectfully. He finished the second chorus with a flourish, and a "pawm" so low it vibrated his toes.

"A dollar for the music," he shouted. He threw his coat on the floor, making sure one sleeve was wrapped firmly around his ankle. "Toss a dollar on the coat."

A young man tossed a Saturnian paper dollar. It floated lazily in the low grav, finally arcing down to the coat. More appeared. Ten already. Half enough for a burger.

Elated, Soren swung into "Klara Klaffen," stamping his foot (which nearly threw him into the air), and pausing to shout the "O Ja" chorus. More dollars appeared. He forgot the crowd, swinging directly from "Klara" to the comic "Die Loecher im Lederhosen."

Cops. Dressed in shiny blue armor, tall helmets, their eyes invisible behind tinted face plates. One on each side of him. Defiantly, Soren blasted out the last "om pawm" of "Die Loecher," lowered his tuba, grabbed his coat, his cash, and stood, breathing heavily.

"This way, please," said one cop. Head and tuba held high, Soren walked between the cops through the crowds. He wondered what Ring City jails were like. No worse than the Ring Rat surely.

The first cop stopped in front of an elevator marked "No Entry." He ran a mag card through the lock.

"Where we going?"

"To the reception," the cop said, his voice flat. "The ET ambassador saw you on the vid. He wants to see you play."

Heaven. The administrative section was to the rest of Ring City as the best nightclub in New York was to the Ring Rat. Lots of room. Potted plants. Tuxedos with bright colored sashes. Women in gowns which would cost most people a year's pay. Long tables loaded with food. Real Earth food. Even with the cops marching him along, Soren managed to snatch a sandwich and a really decent Pilsner beer.

"Ah, the music maker," hissed a soft voice. Soren turned. No one. Then he looked down. An ET looked up.

The ETs were even shorter than they looked on the vid. About a tuba-length tall, with a body like a bass drum. Their faces looked vaguely owllike, with bulging eyes, but with soft little snouts.

Arms incredibly long for such a short body, and ending in hands with flowerlike petals in place of fingers. The petals, all the vid experts agreed, looked delicate but were actually very tough and capable of fine manipulations. Some experts believed what humans saw was actually not the ET itself but its space suit. But nobody had figured what was suit and what was ET. The ETs politely declined to say.

The other thing no one had figured out is why ETs smelled like a wet St. Bernard.

"You are called?" said the ET.

"Soren Sorensen, sir, " said Soren. Then he wondered about that "sir." Maybe it should be "ma'am."

"We have heard your music, but distantly," the soft voice continued. "The low sounds of your instrument pleasure us. May we hear more?"

"Yah, sure," Soren said. Then, in a sudden burst of inspiration, he bowed low. "Soren Sorensen's One Man, All Tuba, All Danish Band at your service."

In minutes, he had an audience. To his left, ETs, fifty or sixty of them. To his right, humans. Glancing through the faces, he recognized several. The American vice president. The brother of the Japanese emperor. Assorted vid stars, senators. A long, long ways from the Ring Rat, Soren thought, nervously.

He'd never played "Klara," better, hitting the low notes hard (the ET had said they liked those), and shouting "O Ja." "Muss I denn," as usual, threw him in the second part.

The ambassador requested an encore. Soren played. Another and another. By now, the polite clapping from the humans had become blatantly perfunctory. But at least the ETs knew good polka. At last, Soren wiped his brow and put down the tuba.

"Is lovely. We will make pay very well for you," hissed the translator ET.

"My honor, entirely."

"My people are very rich, and honor all artist. Even animal artist. We pay well."

Animal artist? Before Soren had a chance to ask for an explanation, the governor of the wheel grabbed his hand and gave him a gushing and obviously insincere congratulations. Taking advantage of the ETs' presence, Soren explained about the little matter of his lack of proper ID. Before Soren had time to down another Pilsner, he had his ID, a credit chip with more cash than he'd seen in years, and an police escort to The Big Wheel Hotel.

Soren got the luxury suite. Shower, real bed, Gideon Bible, a print of Van Gogh's "Sunflowers" on the wall. He showered until the water meter turned off, called room service for dinner, and flipped on the vid channel computer. Of 81 news channels, he'd been on 79, plus 194 of 286 light entertainment channels.

My god. Soren Sorensen's One Man, All Danish, All Tuba Band was the hottest news in the world. He flipped back to watch himself play, shuddering when, as usual, he muffed the tricky rhythm in the second part of "Muss I denn."

"Mr. Sorensen, you have a visitor," announced the guest phone. Lord, morning already.

"Go ahead," Soren mumbled.

He recognized the face on the phone screen as the young professor from the vid show "Alien News Watch." She was about thirty, her skin a light brown, with artificial diamonds glittering here and there in her short black hair.

"My name is Linda Duchamp, sir. I am with the UN cultural and linguistic mission to the ETs."

Soren moaned, and rolled over. "Oh," she said. "I'm so sorry to disturb you. But, ah, this really can't wait. May I continue?"

"Ya, sure."

"I'm an assistant professor of theoretical language and culture at World Union University," Linda was saying. "On temporary assignment to the UN project on extraterrestrial communications." She smiled. "In English, I'm trying to learn to talk to the ETs."

Soren nodded.

Linda took a deep breath. "Anyway, this morning the ET ambassador formally asked the UN for you and one companion—a woman was specified—to visit their home world as a representative of Earth's cultural achievements."

Soren sat dumbfounded. "Me? Represent the whole Earth?"

"Yes. Unless you object, I will accompany you. The ETs did specify one man, one woman, and, at the moment, I happen to be the most qualified woman linguist on Saturn. You could, of course, request someone else. But, Mr. Sorensen, for a linguist, this is a chance of a lifetime." Her eyes were so intense Soren felt vaguely frightened.

"Ya, sure. Only where is this ET world?"

With an effort, she leaned back, got control of herself.

"Actually, no one knows. We must travel faster than light, and how the ETs manage that is something Earth governments would kill to know."

"Humm. Seems no one really knows much about these ETs.When would we leave?"

"Oh, we have plenty of time." She glanced at her watch. "Almost an hour."

For a high adventure dreamed and written about for a century, the faster-than-light transport to the ETs' home planet proved about as exciting as a ride in a Manhattan elevator. Less, since there were no muggers. Linda spent the entire time—maybe five minutes—trying to pronounce the name of the planet, a word that sounded like a cross between a chain saw and a leaky air hose. Finally she gave up.

The big ship stopped some thousands of kilometers away from the ET home planet, and dropped a shuttle with view ports. The sun looked disappointingly like Sol, maybe just a tad dimmer. The planet looked yellow green, instead of blue like Earth. Faintly purplish rings, but so thin as to be scarcely visible. Circling the entire planet from pole to pole, a great silver ring glittered.

"Is pretty to Earthers?" The little translator ET had appeared from nowhere.

"Yes. It's beautiful."

"Most beautiful thing in universe to us."

Soren looked closely at the ET's expressionless eyes. Did incredibly technologically advanced ETs fall victim to homesickness? Somehow, he'd never thought of this encounter from their viewpoint. To them, Earth people must be merely a pack of savages lost in a howling wilderness. For the first time, he felt a little nervous about the ETs.

"Could you tell us what that ring thing around your planet is?" said Linda.

"Information not available for Earth people," said the ET

That didn't make Soren feel any better.

"Please. Now know that unfortunately our atmosphere is very not good for Earth people. You must don protection. Please take off all clothings now."

"Take off our clothes?" Linda said.

"Yes. All. Please. And all jewelry. Very important."

Soren looked at Linda. She shrugged, took off her earrings, then turned her back and started to strip. Quickly, Soren turned his back and did likewise. No peeking, he told himself, shutting his eyes. But then he thought of Linda's lithe body under her dull business suit. His head turned as if it were pulled by a gravitational force. He caught a glimpse of Linda, arms raised to brush the diamonds out of her hair, her small breasts high and firm. . .

For shame, dirty boy! His mother's voice echoed in his mind. Soren turned his head back and shut his eyes twice as hard to prove his innocence.

"Please. Now comes protection." The short ET waved its long arms. From somewhere came a swarm of something like very small bees. Instantly they covered Soren from head to toe, spraying him with a milky liquid. They were unbelievably strong, forcing themselves even under his feet, between his toes, and more intimate places. In seconds, the milky liquid dried into a rubbery skin, which then faded into nothing. As quickly as they came, the bees or whatever they were vanished.

"Skin now very strong," the short ET said. "You may now dress yourself. I go." And it did.

Soren took his time getting dressed, not turning around until he was sure Linda was ready.

She looked at him. "You peeked," she said.

"How did you know?"

"I didn't."

She laughed, then choked with surprise as the shuttle disappeared and they were out on the surface of an alien world.

"My god! Haven't these folks ever heard of doors?" Linda said as soon as she'd recovered.

They were in an open meadow covered with long yellow grass. Overhead, yellow-green clouds rolled in a pinkish blue sky. In the far distance, a building the size of a mountain towered into the sky. Hundreds of aircraft flew soundlessly overhead. A light breeze sighed through the long grass.

"How do they make things appear and disappear that way?" said Soren. He was feeling slightly ill.

"Information not available for Earth people," said the ET, appearing. "Here is device much like your Earth computer with many Earth catalogs available." A screen appeared, hanging in midair. It showed the logos of a dozen luxury stores. "Point to whatever is needed for your comfort."

Beds, tables, chairs, bird cages, pineapples—everything from vintage wines to octaphonic speakers—scrolled by on the screen. Linda picked recording equipment and clothes; Soren went for food, beer, and a case for his tuba. Then, just in a spirit of meanness, he picked an antique spinning wheel. Let them find one of those, he thought.

"Very good," said the short ET. "Your room comes now."

From directly above, a football shaped flying machine lowered itself to about ten meters over the ground. Clouds of the little metal bees swarmed out, forming a buzzing, squirming pile on the ground. Walls rose from the ground, then a roof.

In maybe three minutes, there was a pretty little cottage where before there had been nothing but grass.

"You stay here, get rest," the short ET said. "Then you play first All Danish, All Tuba concert for my people, yes?"

"Ya, sure," said Soren, a little dazed.

The ET vanished. Linda and Soren stepped into the new house. Everything they had asked for was there. In fact, the table was even set with a baked ham dinner. He glanced around. In one corner, he saw the antique spinning wheel.

"Soren, I don't believe it." Linda shook her head. "I'm glad these ETs are friendly. I'd hate to see what technology like this could do if they really got pissed."

Soren took a Pilsner from the cooler. Thoughts like that didn't bear thinking about.

It took Soren some time to get used to concert halls bigger than football stadiums being built ten minutes before the concert, then vanishing two minutes after the last customer left, leaving not so much as a candy wrapper behind. Other than that, playing for ETs was a snap. Much like playing for a bunch of fire plugs, Soren thought. He strained his cheeks blowing om pah, shouted his throat dry in the "Jawohl O Ja" chorus. No ET ever clapped or smiled. He taught Linda the traditional polka dance steps, or as much as he remembered. She quickly filled in the rest. The result was Bavarian with a touch of soul. Soren loved it. What the ETs thought was anyone's guess, but they packed the concert halls.

Between concerts, Linda spent every waking moment studying the ET language. She had enormous drive and energy, but as three months rolled by, she began to have long periods of silence. Soren wasn't too surprised to come home from a walk and find her crying.

"I just can't crack it," she said. "This language is like nothing on Earth. We can't make these sounds. The grammar—I've been studying night and day for three months. I can't even find the verbs. If there are verbs."

"I barely know what a verb is. You're doing fine."

"The chance of a lifetime, with all Earth counting on me, and I've never felt so incompetent in my life," she said. Awkwardly, conscious of his clumsiness, Soren leaned over. He stroked her face, smoothed her hair, let his hand massage the back of her neck and shoulders. She looked up at him. "Soren, they have things they don't want me to know."

"Yes. But there's nothing we can do.

If we tick off the ETs—well, this is their world, not ours. And if they don't give us a ride home, it's a hell of a long walk."

"We're helpless as children."

"Linda, against this kind of power, the entire Earth is helpless."

The next day the ET popped up with its customary abruptness. Guy ought to do a magic act, Soren thought.

"Almost time for your last concert. Then you go home, yes?"

"Yes." Soren said, with much relief. He'd never been so comfortable in his life, but right at the moment he'd love to see even the streets of Ring City again.

"Only this is very, very important concert. More important than all the rest together. You will play in the capital city. Our Supreme Committee of Policy will be there. You understand? Like your president. Very most important for you to make excellent impression. You understand?"

"Yes, a command performance."

"Much more important. It could make you and your friend lucky persons, with much wealth to take back with you. Or. Very important or. If you do not do excellent, it is very unlucky for your entire people." Without a good-bye, the ET was gone.

"Linda, I think the ET is trying to warn us."

"Yes. I think so. That's the closest to emotion it's ever showed."

A cool shiver traveled down Soren's spine.

"I think maybe I'd better try practicing that second part to 'Muss I denn.'"

"I think so, too. And I'm going to listen to my damned tapes for the four thousandth time." She went to her bedroom. Soren picked up his tuba.

Cold as ice. Again and again he plodded through his personal Vale of Tears. "Om pawm pawm, om pawm PAWM." Just to experiment, this time he transposed the whole song down an octave and ran it through.

Suddenly Linda shrieked. Soren stopped playing in astonishment. Her head poked out of her room. "Play that again! Just that way. Real low."

"Om pawm pawm, om pawm PAWM."

"Again. Keep playing!"

He played on.

"You darling, you big blond Dane doll," she shouted, running out of her room. She kissed him, tussled his hair.

"That's it!"

"What's it?" Soren wondered if she'd been working too hard.

"Those low notes. No wonder I haven't got anywhere with this language. I've been looking at the wrong sounds."

"What do you mean? In words of one syllable."

"Look. Human speech sounds are at maybe 100 to 600 Hertz. So when I see the same frequencies in ET speech, I figured they were the sounds of the language. Wrong! To the ETs, those are just sounds. Like humans coughing or whistling. I've been trying to make a grammar of coughing and whistling! How dumb can I get? I've got to go much lower, look at the signals around, oh, say, 2 to 100 Hertz. Hardly sounds at all to our ears."

"Maybe that's why these ETs like good tuba."

She looked at him. "Yes. Of course. It would have to be. Low-pitched sounds. Most Earth music must sound like toneless screeching to them."

"I think I'm going to transpose everything lower. This thing can go to the basement."

"Great idea. And I'm going to see if I can make some sense of this language."

The big day, as big days do, came much too soon. This time the short ET arrived in an aircar. With the standard ET disdain for doors, Soren and Linda simply walked through the wall. Flying at tremendous speed, the aircar still took an hour to reach the city.

The city was mind-boggling. To Soren's eye, the skyline looked like the Rocky Mountains of Montana. Clouds of aircars circled like bees around a hive. Here and there, smaller buildings grew, or old ones vanished. Evidently only the great mountain buildings were permanent.

The concert hall was just being finished when the aircar arrived. The sight struck Soren nearly speechless. The hall was the image of Earth, a globe maybe 200 meters tall, and with every feature reproduced in meticulous detail.

The symbolism couldn't be more obvious. In this concert, Earth had much at stake. Soren wished to hell he knew exactly what it was.

The aircar pulled up in front of the concert hall, and in ET fashion, vanished, leaving Soren and Linda standing. Giant vid screens covered the base of the globe. Soren listened to the ET voices. Linda was right. Along with hissing and clicking, there was a strong bass, a vibration just at the low range of hearing.

"Soren, you go to your dressing room. I'll join you later," Linda said, touching his elbow. "I think I just might make out a bit of what these screens are saying."

The dressing room was magnificent, but Soren didn't see it. The whole Earth depended on him, and it didn't even know. His mouth was dry. He took a sip of water, sloshed it between his teeth. Still dry. His stomach hurt. He wished he was back in North Dakota playing for the wheat farmers. They begrudged you every nickel, but at least they opened doors before they went through them.

"Soren!" Linda rushed in.

"Linda, that's the palest face I've ever seen on a black person. What happened?"

"The wall screens. Soren, this isn't a concert, it's a test!"

"Just what I wanted to hear." His mouth felt like one of the warmer sections of the Sahara.

"It's a test to see whether humans are intelligent sentient creatures. They think we have no higher culture. Soren, they think we're just animals."

"Animals? What are you talking about? We have rocket ships, computers, tubas."

"And gorillas use twigs as tools to catch ants. That's all our technology means to them. Gorillas using twigs to catch ants."

"Arrogant bastards."

"Yeah, that's what gorillas say about us. Shut up and listen. Do you know what they plan to do to Earth?"

"You said 'shut up'—"

"Shut up. They're going to make a theme park out of it! A wilderness experience for rich ET tourists. Soren. Damn. You have to play as you've never played before, you have to prove humans have culture. Or your children and mine are going to grow up as exhibit A in an ET Disneyland."

On second thought, the Sahara was much wetter than his mouth.

"Linda, I can't do this. I'm just a second-rate tuba player. I'm not a hero."

"Soren! No! Don't forget Danish pride."

"I'm not even a real Dane. I'm from North Dakota."

"And I'm from Boise, Idaho. But there's the blood of lion hunters in me. Soren, don't forget. The blood of Vikings run through your veins. Get out there and show those damned ETs what tuba's all about."

"Muss I denn" flopped. He knew it. For once, he could see it in the thousands of insect eyes of the ETs.There were row after row of them in the great globe that represented the fate of Earth.

He lowered his tuba. Linda, holding the music, looked at him. Her eyes were full of fear.

"I can't. I just can't."

"No, damn it, Soren." She grabbed him by the shoulders, pulling him down until their noses touched. "The blood of Vikings! This is for Earth! For Danes. For me and you. For everyone."

He shut his eyes. Then he opened them, looking up into the long rows of silent alien faces. Was that scorn in those dull eyes? So he was a gorilla using twigs to catch ants. Damn them! What gave them the right to judge him?

Anger stirred. He let it. He stared into the rows of blank faces. He wanted to break through them, smash them, split those rows into splinters.

Then he saw it. The dragon prow of a Viking ship, white foam flowing around the neck, smashing through those arrogant waves of heads. Vikings. His father's fathers. And the long oars, sweeping through the cold Atlantic like dancing legs. Stroke, a one and a two, stroke, a one and a two, stroke. Viking music, rowing through the howling Atlantic in two four time. Perfect rhythm. Danish rhythm.

"DANES GOT RHYTHM!" he shouted to the rows of poker faced ETs. He snatched the music from Linda's hand and threw it fluttering into the air. "I don't need that stuff anymore."

"OK, you shortie little bastards," he growled."Maybe you know space and time, but I know good tuba."

The first note wasn't a note. It was a growl, a tremor in the ground which rolled up from the floor. Soren saw Linda's eyes widen with astonishment. They flashed with joy as he swung into "Klara Klaffen" with an om pawm that would have rattled the windows had there been any.

His tuba growled like a bear, rumbled like a locomotive. It was alive, the great bell vibrating in his hands, nearly leaping from his fingers. Linda jerked up her skirt and flickered across the stage in a heel clicking, bottom shaking, leg flashing dance of triumph.

The ETs watched impassively. Then, slowly, the first row leaned to the left, the second to the right, then the other rows took up the movement.

The ETs were doing the wave!

"Jawohl O Ja,"shouted Linda, and

Soren, perhaps to show human unity or perhaps out of sheer excitement, shouted "Jawohl arriba!"

"You have done most excellent well," said the short ET. Soren just looked at him. There'd been so many encores he finally had to be helped off stage. "Our Committee on Policy very much like you. We honor all artist, and pay well. They still believe you are animal, but very special animal. They have declared entire Earth and Solar System a protected wilderness area. Your people will not be disturbed."

"Do not feed the animals, huh?" said Linda. She looked at Soren. Linda touched his hand. "You came here a second-rate tuba player. You're leaving here an artistic ambassador of Earth."

"You are welcome to leave now," said the short ET.

"Let's go. Only one question," said Linda to the short ET. "I'd like to say good-bye. What is your name?"

"I am called," the short ET made a throbbing sound, "and good bye is . . ." He rumbled.

Linda's face fell. "No human can possibly make that sound."

"Wrong," said Soren. He put his tuba to his lips and blew a fond farewell to the short ET. ■

●To many people, dramatic criticism must seem like an attempt to tattoo soap bubbles.

John Mason Brown

●Few things are harder to put up with than the annoyance of a good example.

Mark Twain

State of the Art

WHEN DINOSAURS RULED THE AIRWAVES

Frank Catalano

We've just gotten used to being an "information society," but we're quickly becoming a very different one.

Twilight, on the Electromagnetic Plain.

Slowly it moves, feet leaving newsprint images, body trailing audio tape.

It is the end of an era.

All manner of information-spawned creatures from broadcast networks to wire services feel it in the air. In large part, their demise is due to the very developments that gave them great strength over the past 20 years: satellites, computers, and cable television.

But let's begin with the structure of this Mediazoic Era, as we know it.

THE MEDIAZOIC ERA

Basically, there are a handful of national broadcast networks (ABC, NBC, and CBS) and two national wire services (Associated Press and United Press International) determining national news coverage. Under the current system, these big guys gather most of the major news and disseminate it to your local news outlet—a radio or TV station, or newspaper—directly, or what they cover influences what your local news outlet covers. And they influence each others' coverage.

Let's say network X hears about a story. They lead with it on a newscast, and as a result, your local TV station which carries network X runs the story. The local station may decide to do a local angle on the story; perhaps how that national story affects local people. But that's not all. The other big guys also monitor network X and may believe they can do the story better. So they do the same story. The local TV, radio, and newspaper outlets that carry the other national outlets' stuff then carry the stories, and add *their* local follow-up pieces. Some of those local angles are further parroted by other local news outlets that decide they can do it one better than their competition. This is why you tend to see not only the same news story, but the same variation on the same news story, for days on both local and national news. Not very efficient use of newsprint and air time, is it?

THE ERA IN TRANSITION

Things began to happen within the last decade that started to challenge the dominance of the Networkasaurus. Cheap satellite time, for one—it's possible, today, to buy satellite time for a decent quality audio signal on Satcom 1R, covering much of the US, for a mere $60 an hour. There's the spread of cable systems with lots of capacity, which improved the signal from broadcast television and let it reach a greater audience. And there are incredibly cheap and powerful personal computers, speeding creation of complex newspaper and television graphics, transfer of information between network news bureaus, and typesetting through electronic means.

At first, these changes seemed to make it easier and cheaper for the big guys to gather and distribute information. But local stations and newspapers, much more interested in getting a story in a way that made sense to their distinct audiences, realized they could use the same techniques that had been the exclusive province of the national news services. They just hadn't before, precisely because of the cost and complexity of the old methods. And the flow from the information spigot began to reverse.

The place: Mexico City. The year: 1985. The event: a major earthquake that leveled much of Mexico's capital. Communications were spotty. A number of broadcast stations, frustrated by their inability to get a local angle on people from their area in the earthquake zone, pooled resources, bought satellite time, and formed ad hoc "networks" to cover the disaster, sending back customized information to each of these networks' "affiliates" in a manner the large, lumbering, national beasts couldn't hope to match. Personal computer links coordinated the efforts, transmitted scripts, and helped with logistics. Satellites cheaply and nearly instantaneously delivered the news feeds.

The scene repeated itself in Berlin in 1989 when the Berlin Wall came down. And it's happened in dozens of instances since when a rapid, localized response was needed for an event of worldwide importance. The networks simply weren't in a position to deliver what local stations needed. They had to appeal to a mass audience nationwide and couldn't get into a lot of detail. Not so the ad hoc networks, which flexibly pop up and fade away among stations with the same ownership, the same geography, or just the same interest in a story within hours after that story breaks.

Not only are the ad hoc networks a threat to top-down news service dominance, so are changes in information gathering that short-circuit the entire "we gather, you consume" news mentality. Here the traditional news consumers—you and I—are bypassing the traditional news distribution channels to get the news directly, or even capture the news *before* the scaly beasts themselves get up the energy to slide off of their rocks.

During the 1989 San Francisco earthquake, when phone lines into the Bay Area were at a premium, computer bulletin board systems like Prodigy and CompuServe acted as informal information clearinghouses. Those inside the earthquake zone posted information about survivors, causalities and damage on these national, even international, computer information services accessible by anyone with a PC and a modem. Personal computers also make it possible to distribute professional-quality newsletters quickly and cheaply. Cellular telephones give anyone in a car the ability to be a radio traffic reporter. High-quality TV and audio recording equipment is now cheap and easy to get: everything from Super VHS camcorders to Digital Audio Tape cassette recorders. It wasn't a local video news crew that captured the police beating of Rodney King in Los Angeles.

INFORMATION CHAOS

Right now, the traditional news gathering system survives on sheer inertia. News from national news "distributors" to local news "retailers" is too ingrained a system to change overnight. But it is changing and those changes are starting to bring confusion into the neat, orderly news dissemination model that's survived for decades. We're entering the era of Information Chaos.

Submitted for your consideration:

Cable television. Do you have any idea how many cable channels are available to you where you live? And what they all cover? You can bet NBC, CBS, and ABC have a pretty good idea, because these cable-only channels are siphoning off viewers and, just as importantly, advertisers. Network television can't compete with the sheer variety available because, again, they have to target a mass appeal audience. And advertisers (and apparently viewers) prefer precisely targeted programming for both news and entertainment. So while the Big Three are laying off news people, closing news bureaus, and even talking about cutting the number of hours of prime time programming they offer to local TV stations, cable networks are booming. CNN is actually planning on expanding its international news bureaus. (Don't think of CNN as a "network" like the Big Three. It doesn't program news *and* game shows and soap operas and cop shows. It's a narrowcaster, not a broadcaster, because all it programs is news.) Even MTV, Music Television, and Nickelodeon—the kids' network—plan to add targeted news to their programming.

Digital Audio Broadcast. Think you have a lot of radio stations now? Wait 'til a new technology, Digital Audio Broadcast (or DAB) gets off the ground. There are a couple of competing systems being tested right now in Europe and elsewhere. DAB delivers CD-quality audio either transmitted from a satellite or terrestrial sources to a long, thin, flat antenna on your car or home.

Thanks to digital's ability to be multiplexed (have several "channels" of programming embedded in one stream of data), there will be few practical limits to the number of DAB stations. The big question isn't whether there will be DAB, but when and which system. Expect it this decade.

On-line computer services. CompuServe and Prodigy are the largest of the commercial, consumer-oriented computer bulletin board services that charge a fee for customers to get access to their databases with a PC and modem. But in terms of what you can get and how quickly you can search it, they're cheap. You can browse and download news from AP, UPI, Reuters, Dow Jones, and scads of other traditional news services directly, without having to wait for someone to tell you about it on TV or radio, or have a copy editor rewrite it for a newspaper. There are also full-text (meaning the entire article) databases of magazines and newspapers and special-interest newsletters. Not only that, but since users of some of these services can "post" messages of their own (such as during the San Francisco earthquake), there's no need to rely on the official news services for news. Many of CompuServe's professional forums, including BPForum for broadcasters and JForum for journalists, spread information much more rapidly than official channels. And these are just the two largest services. There are specialized on-line services for financial analysts, lawyers, medical professionals, librarians, and others—all you need is a modem and a subscription.

DEMOCRATIZATION OF INFORMATION

Welcome to the dawn of a new age: the age of the Democratization of Information, where information from a bewildering variety of sources is as accessible as a voice is from your telephone. Where you can be both the source and consumer of the information, the subscriber and publisher simultaneously, bypassing the traditional channels. It is, as science-fiction writer Rob Swigart once noted at a computer conference, as though a dump truck of information has overturned on us. How do we dig out? And how do we find the items valuable to us in the ensuing cacophony? As the old joke about psychology goes, the pile's so big, there's just got to be a pony in here *somewhere.*

Let's drop our dinosaur comparison and now look at news gathering and dissemination as a different model, that of distributor and retailer. Currently, the networks and the news wire services are the distributors. They get the news and distribute it to the retailers, or the TV and radio stations and newspapers we turn to for daily news. As noted, the model is very top-down, and very shaky when it's threatened or circumvented.

The expansion of information gathering and dissemination technologies are blurring the distinction between distributor and retailer. When you access the AP or UPI wire directly through CompuServe, you're not waiting for someone to decide what's important at the "retail" level: you're making the decision for yourself. You've bypassed the retailer. If you gather news via videotape, or by posting something on an online service, you're suddenly a news gatherer yourself in the distribution channel.

With that access cheaper and easier than ever for retailers and consumers, the decentralization of news gathering and distribution technology has led us into a period of information overload. It's only going to get worse before it gets better as more cable system capacity is added, there are more sources of digital "radio stations," there are more personal computers with modems added to the infosphere, the Baby Bells get into the information distribution business, and the traditional distributors and retailers themselves start getting into these new areas to cover their bets, their investments in existing infrastructure, and their asses.

So back to Rob Swigart's dilemma. What's valuable? How do you tell?

You buy yourself an editor.

It's not like the *Washington Post's* Ben Bradlee is going to show up on your doorstep. But the rapid development of inexpensive "fuzzy logic" microprocessors (which know when you say, "Park my car within a foot of the curb," that you mean approximately a foot, not precisely 12 inches, and therefore execute a command with a minimum of fuss, effort, and backing-and-filling) should allow smart filters to start showing up in all sorts of information appliances. Depending upon your level of sophistication, you can buy preprogrammed smart filters to sort through your news from a variety of sources, or program one for your specific interests.

For example, let's presume you're sitting in your car, listening to your favorite DAB or traditional low-fi radio station. You know you can only listen to one radio station at a time. But your smart filter, built into your car radio, doesn't have that limitation. And you've bought the Traffic Model. It scans all the incoming audio channels for any mention of the words "traffic" and "Interstate 5" (your daily route) and then automatically flips the station to the traffic report you need, even digitally delaying the report to make sure you hear it in its entirety, or turning the radio on automatically to play it for you if you've decided not to listen to music that morning.

Or you're at home that evening, and you're curious about the news that day. So, at a time of your convenience, you turn on your "information appliance" (call it a TV, call it a personal computer—it won't matter). You've programmed the included smart filter to scan the electronic version of your daily paper (which still has local reporters), 17 video channels, 4 audio channels, 6 on-line services, and the PTA newsletter from your child's school. You've told it to rank the inputs in hierarchical importance based on key word of subject ("sex," "drugs," and "rock 'n'roll" might be one set of choices) and on geographic distance from where you live. It's selected and ranked all these stories. Finally, your standing instructions are to keep the entire package under 30 minutes, so it's dropped everything that doesn't fit in that time frame based on its overall ranking. Of course, you've also instructed the filter to keep related stories off-line, out of the 30-minute news flow, just in case you want additional information on any topic. And if the report doesn't have any integrated audio, you've asked the filter to provide a pleasant, cultured BBC-style voice (or crude and uncultured Brooklyn-style voice; your preference) to read you the news item in the news flow.

You can change the programming of the filter, its news sources, length of newscast, and more at any time, with any luck much more easily than you can program your VCR today. Of course, if it's too much trouble to wait until you get home to get the news, you can always have it bounced off a satellite to wherever you are with your digital satellite receiver (pager/phone/video).

What's this, you say? You don't *want* to have to program a smart filter—all you want is the news? In that case, just go down to your local appliance store and pick up any of several preprogrammed smart filters. You won't be limited to a single interpretation, either. There will be the equivalent of the Peter Jennings model, the Walter Cronkite model, and if you have a fondness for sweaters, the Dan Rather model. There's no reason these editors have to be based on the judgments of living or even real people. A Martin Luther model might program the newscast for stories with religious significance, while a Jean-Luc Picard filter could search for stories about where no one has gone before.

Hardcore news consumers may eschew the filters and go to the distribution source themselves, if they choose, because they know exactly what they want and don't mind getting their hands dirty. That option is still there. But most of us—likely by the turn of the century—will be able to issue instructions as to what we want to hear about, who we want to hear about it from, and how much of it we want to hear.

RELIABLE SOURCES

But wait. If almost anyone with the right equipment, be it video, audio, or text-based, can also be a source for this information for the distribution channel, how do you choose a reliable source?

Whom do you believe?

Actually, that decision may even be easier in the next ten years than it has been in the past ten. With the current top-down information dissemination model, the networks and news services tend to feed off each other, sometimes repeating and spreading the same bad facts before a correction works its way back up to the top from a local station or reporter. With news consumers able to be news producers at both the distribution and retailing levels, it'll be easier to verify information when it gets into the channel because more sources, not fewer, will be able to access it early in its information life cycle. The process, through sheer speed, will be self-correcting. Unless, of course, you want information of sensational nature. There probably always will be a market for the *National Enquirer*.

It also will put a premium on unique information; no longer will commercial news sources be able to get away with a dozen nearly identical parrotings of the same White House news release. Those reporters and news sources who can add additional facts or even do what's called "enterprise," or original, reporting not based on a scheduled event or news release will be in great demand in this highly-competitive democratized news world. People will want to subscribe to services that give them something different. This benefits both the news distributors and retailers: there will be more distributors in competition for the "hot" story, and retailers will have more, and more varied, distributors to choose from.

While the technological future appears bright for news junkies, as with duct tape and the Force, there is both a light side and a dark side. Will, for example, people hear the things they need to know, as well as the things they want to hear? It's pretty difficult these days to tune out news about a presidential election, or a major poisoning scare. But if your smart filter has been expressly told to ignore news items of general interest, will you hear about them other than over the office water cooler? Will it be too late to respond properly? Might not a national government require certain news items get a "universal" tag to make sure every filter puts it through?

With easy access to contribute to so many sources of information, rumors might spread like wildfire. But they also might be snuffed out just as rapidly by more reliable sources, and the unreliable sources might disappear over time as a result of market forces that reward accurate information. If knowledge is power, knowing how to program very sophisticated smart filters on-the-fly during a geopolitical or corporate crisis may be a very lucrative career path. Reporters may find it more satisfying to consider themselves free agents, selling their work to the highest-bidding distributor (as movie stars do today) rather than tying themselves to a single news organization. Protecting information through copyright may become even more difficult as sources blur and country boundaries mean little to satellite distribution.

With the democratization of information comes the fragmentation of information. The new concept of renaissance men or women may be those who openly let themselves be bombarded with a variety of general information, and don't choose to limit their sources. Those who severely limit their sources could create an information hermitage.

It's the ultimate freedom of the press. There won't be a lack of information or tight-fisted high priests who control access to it (as was the case in the Dark Ages). Rather, there will be the ability to choose both sources and "editors" of those sources. But this won't come until we get through the growing proliferation of news sources and gatherers, the resulting confusion, the end of news network and wire service dominance, the development of smart filters, and the accompanying readjustment of social equilibrium.

Listen. Did you hear that? It sounded like the clatter of a teletype machine—the death throes of the Networkasaurus. But the seeds of its smaller, faster, and more flexible successor are already growing in your personal computer, telephone, and cable system. ■

ABOUT THE AUTHOR

Frank Catalano spent 14 years as a professional broadcaster, including work for Seattle-based KING-AM and TV, NBC Radio, and Mutual Broadcasting, and has been a columnist for several radio/TV trade publications. He's also a science fiction and science writer, and now works in the computer industry.

○To some lawyers, all facts are created equal.

Justice Felix Frankfurter

●There is a great deal of difference in believing something still, and believing it again.

W.H. Auden

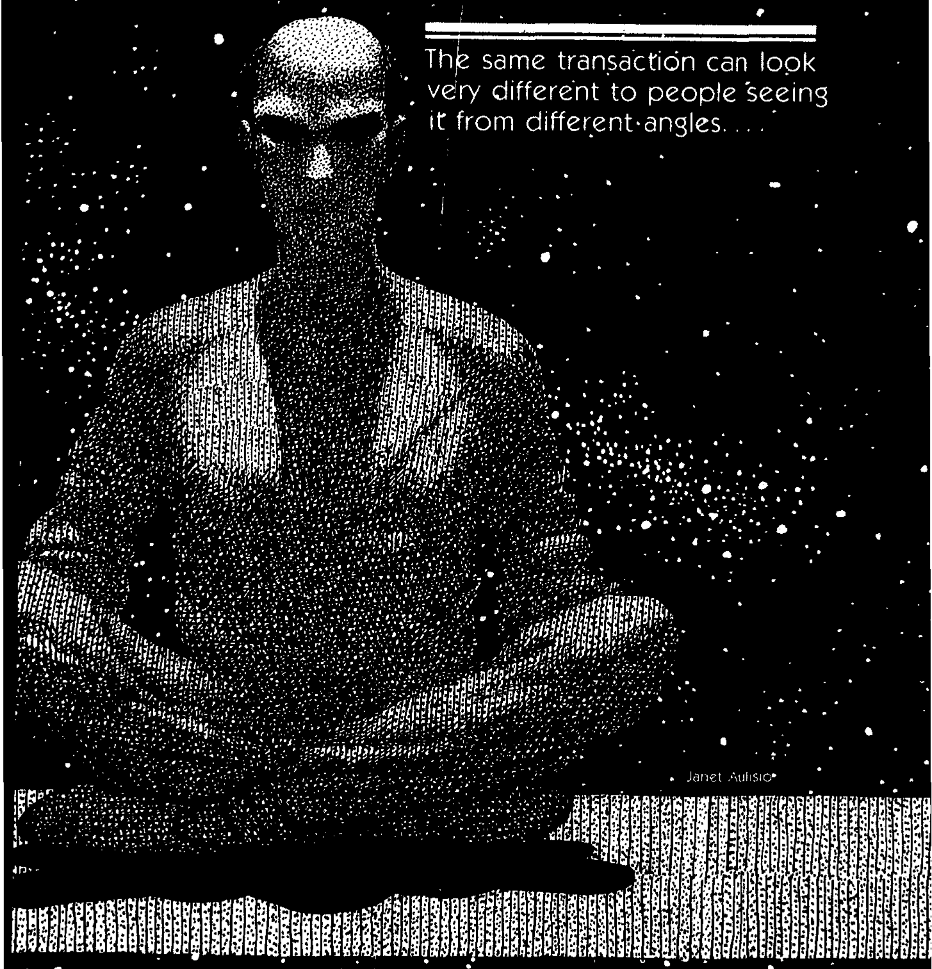
●If we succeed in acquiring the love of learning, the learning itself is sure to follow.

John Lubbock

MARK ON THE WORLD

Dean McLaughlin

The same transaction can look very different to people seeing it from different angles. . . .



Janet Aulisio

Appropriate, perhaps, that Professor Howe would begin his lecture on Hamlet's state of mind with a discussion of the much quoted soliloquy. Different performers, he observed, would speak the lines with different stress, inflections, pauses; always the words and fundamental thought were the same.

Appropriate also, perhaps, that Manda Callan's beeper then should burst forth with its alarming *weep, weep, weep*. As quickly as she could, she shut it off and gathered books and papers together into her bag. All around, fellow students were looking at her, not making a sound. She grabbed her sweater off the chair back. Even Professor Howe had stopped talking.

They knew. They all knew. She wished they didn't.

Clutching her book bag by the shoulder strap, she 'scuse me'd between knees and chair backs to the aisle. Everyone watched. One of the girls momentarily gripped her hand. Some of the guys grinned encouragement. Sort of fun to bump knees with them. She dodged their eyes.

Long way to the back of the lecture hall. She started up the aisle; didn't want to appear to be in too much of a hurry, though she was. Breathe deep and keep a steady pace. Thin blood, you know.

"Ms. Callan." Professor Howe's strong voice. Manda froze and turned. Surely he knew she had to leave.

"Ms. Callan," Professor Howe had said again, a less commanding gentler tone. "Modern life is not without its theatrical moments." He paused, as perhaps innumerable Hamlets might pause; their sense of audience anticipation.

"Good luck," he said.

And the lecture hall exploded with cheers and shouts and yells and applause, and all of them on their feet, and every face turned toward her. Manda stood paralyzed. Life wasn't fair.

Only one thing she could do: an eager grin, a fist in the air, and blow them a kiss. Then she fled, their yells and applause and stamped feet roaring in her ears, and one bold call, "Go get 'em, lady!" nipping at her heels.

She unlocked her bike from the rack. Half a mile across campus, and already out of breath. But out here, at least, no one recognized her. Just another coed climbing on her bike to get somewhere—the library, dorm, another class, or to meet a friend. They'd probably seen the stuff in the *Record* but they wouldn't know it was her; besides, the photo had been from before she had her hair cut short. Minimum weight, they'd said ponderously. "We have been made to understand that mass is a significant factor," they'd explained.

Not so short it looked geeky, though; a girl had limits.

"That's why I got picked?" she asked. Small boned and not much height, and generally looking like chicken wings; pale, and her hair an almost colorless yellow. None of it things she'd asked for. Given a choice, she'd be more averagely tall, athletic, healthy.

"It was one of our considerations," Dr. Briscoe admitted. "Other criteria dominated."

"Such as . . . ?" she found the boldness to ask.

"The committee's discussions are private," Dr. Briscoe said. "If you think, you'll see why."

She gave him straight eyes and—oh, all right—a shy grin. "I've been through triage before, Doc. I know how it is."

That was the second time she talked with him about it. The first time . . .

Usually she'd seen him something like every ten days, a day or two after dropping by the lab for blood samples—sometimes a few other things—and a nurse to look her over, after which it was whatever Dr. Briscoe recommended. Or like after that transfusion when she'd spiked a high fever and they had to flush her out and keep her going with plasma and fluorocarbons for thirty-three hours for the reaction to stabilize before trying again. He'd come and stayed with her thirty of those hours, when even the interns couldn't stand it any more. This time, though, with four days to go before her next lab date, his office nurse had called. He wanted to see her. Four this afternoon?

She got out of botany lab at four. How about 4:15?

Let's say 4:30. Don't want you to overexert. (Translation: running on someone else's blood, don't want to wear it out.)

Aw c'mon. Medical Center's not *that* far.

Four thirty.

Someone else was inside, talking with Dr. Briscoe. Tall, hoe-handle lean, white haired. Greyish complexion. The nurse sent Manda straight in.

Dr. Briscoe introduced the stranger as Gideon LeClair of the physics department. Dr. LeClair, yes, but Ph.D., not M.D. so call him Professor. He'd sent a memo around the Medical Center a few days ago—all senior physicians. Intractable cases. He had a curious proposition.

Intractable, was she?

Dr. Briscoe ticked off the points. Eight marrow transplants, four from her father—a stubborn, courageous man whose luck was bad; two cultured from her own taken before they zapped her, and filtered somehow to remove the bad stuff, they hoped, only it didn't work; and finally two from anonymous strangers who showed a close match. Each, initially, had seemed to take hold, but then the trouble started again. Each time, the duration had been shorter. She'd survived three transfusion reactions by the skin of her teeth. Chemotherapies had produced brief results, then failed. Continued efforts and remission intervals might keep her going another two years, plus or minus. Charting a graph, the slope was downward and showed a tendency to bend more steeply.

She'd lived with it so long it was mere dead facts. Hadn't anything to do with who she was. And—glance Professor LeClair's way—she'd been whole-body zapped so many times she didn't think another try gave much hope. Just made her so sick she felt already dead, her babies would all have seventeen fingers and no head, and probably gave her cancer, besides.

This wasn't that, Professor LeClair said. He slouched in his armchair, long legs straight out and long fingers tip against tip. Pepper-grey eyebrows. In a sense, he was merely a messenger.

Intermediary. A very odd business.

He spoke slowly, as if each word was a molecule to be measured, weighed, its temperature taken, and passed to a chemist for analysis. He directed the Magnet Lab, and there had been, well, to call it an accident would not be correct. Something strange.

"I will try to be simple," he said. "We have been working on a new magnet. Seventy-five tesla pulse, repeatable, reversible polarity. Several laboratories around the country are trying to do the same, so of course we have been trying to be first. I'm not sure you know how it is."

Some answer seemed expected of her. "Sort of like a race, only you do it with your heads. But if you're thinking to magnetize my hemoglobin," a glance to Dr. Briscoe, "that's my problem. I'm not getting any."

"Rather more complicated . . . " Dr. Briscoe commented, but with a gesture chopped off the digression.

Professor LeClair resumed. "We had, ah, tweaked our unit to sixty-three tesla, four nanonseconds, and were conducting a further test when a . . . a powerful rumbling sound, like thunder, was heard from its isolation chamber. Naturally, we investigated at once. We thought the liquid helium tank might have burst."

Manda was getting restless. "Peek through the keyhole. Right?"

"We have an inspection window. Several, in fact. And mirrors. Perhaps you do not understand how powerful, and therefore dangerous, such a magnet is."

"I'll take your word for it," Manda said.

"We found," Professor LeClair continued, and a tone of puzzlement entered his voice, "that our unit was gone, and in its place stood what looked like a refrigerator, except it was too large, and rapidly accumulating hoarfrost on its outer surface. In spite of the fact that we keep the humidity down there extremely low."

"Humidity louses up the magnets," Manda inferred.

Professor LeClair gave a respectful nod. "Our unit's electrical cables and helium recirculation pipes were cleanly severed, no marks to show how it was done. That is a minor detail. The refrigerator thing, now, it goes without saying we have examined it thoroughly. The door is latched by two simple, externally mounted sliding bolts. The hinges are a very ordinary leaf and pintle design, also externally mounted. At all points checked, the door's seal is apparently machined to fit its frame perfectly to within one times ten to the minus four micron. In effect, optically flawless. I doubt it would let even hydrogen leak appreciably. Reflection spectra have shown its surface to be composed of essentially pure gallium which, we don't know how, succeeds in staying solid regardless of changes in temperature. Volumetric weight investigations suggest it is gallium throughout." He appeared to notice Manda's frown. "You know, don't you, how uncommon refined gallium is? Some of my colleagues were strongly tempted to steal it to build a neutrino detector."

"Actually, I was wondering what this has to do with me," Manda said, "I mean, it's sort of interesting, but . . . "

"He's coming to that," Dr. Briscoe

assured.

Manda settled back. "Sorry. Been living on a fast track too long. Had to, if you know what I mean." Perky grin to take the bite off it.

Dr. Briscoe looked aside. Professor LeClair paused, but then pretended not to have noticed.

"The compartment was empty, but for a piece of . . . for convenience, I will call it paper, though its composition is as enigmatic as the rest of this business. On one side is a sketch which at first we thought a perfect copy of the . . . you may be too young to remember the first space probes, but the first ones to escape the Solar System carried a plaque with a sketch of a man and a woman, plus some other details, on the unlikely chance intelligent beings somewhere might find it some day."

Manda laughed. "They sent it back."

"Almost correct, I'd have to say," Prof. LeClair admitted uncomfortably. "However, upon checking we found discrepancies. The original sketch showed only the man and the woman. Without clothes, I should add. In this one, the woman is holding a clearly male infant—nursing it, in fact—and . . . " He slowed and looked uncomfortable " . . . and also unlike the original, in this one the woman is shown to have a . . . a vulva."

This time, Manda had to laugh. "Somebody's having fun with you guys."

"We considered that," Professor LeClair agreed, still stuttery. "By itself, yes, that would be the obvious interpretation. But no, taking all the evidence into consideration, we must reluctantly conclude that whatever people sent this . . . this object . . . were saying to us, 'We are like you.' Perhaps, though, in addition, they took the opportunity to amuse themselves."

"Wouldn't you, if you had the chance?"

"Were I sure my intent would be understood," Professor LeClair said soberly. "When dealing with strangers . . . absolute, total strangers . . . do you understand the risks?"

"Could be they see it different," Manda said.

"Quite possibly." Professor LeClair arched an appreciative brow. "Understand, I have been looking at this matter—entirely outside my field—for nearly two weeks. Everyone I consult brings new points of view. I frequently feel I know less now than when I started."

"We've drifted off," Dr. Briscoe said.

"Ah. So we have." Professor LeClair gave him a grateful nod. "The other side of the paper had a short message. We had difficulty understanding it; it purports to be written in English, but rather as if translated from, say, Hindustani by an Eskimo. We are requested to place inside one person who . . . their phrase is: 'resists correction of difficult body disorder assuring permanent fatality.' Oh, and I should mention that the typeface employed does not match any font known to have existed."

Manda thought about that for a while; the phrase, not the font. "So, naturally, you thought of me."

"You were one of the candidates advanced," Dr. Briscoe said.

"Uh huh. Then what?"

"Understand," Professor LeClair said, "we do not want to confuse interpretation with facts. The implication is strong that, by a process not known to us, some individuals at some point in the future have exchanged the refrigerator thing for our magnet. Such individuals might reasonably be expected to have other abilities beyond our own, such as to cure illnesses of which—" A nod toward Dr. Briscoe "—our present state of knowledge is not capable. It is also implicit that, having performed one exchange, they can do it in reverse. I repeat, however, all that is conjecture."

"Time travel's what you're saying. Like on television."

"Other hypotheses are possible, including some not yet thought of."

"But that's where you're putting your money."

"It is the simplest guess, not automatically the most correct."

Manda turned to Dr. Briscoe; him she could trust. "This isn't some tricky game from the psych department, is it?"

Dr. Briscoe looked both amused and, for some reason, pleased. "He is exactly who he says," he said soberly. "I have seen his refrigerator thing, some of his other evidence, and the message. I have also resolved, from the beginning, not to give you false hope. Nor will I permit anyone else to do so. Does that answer your question?"

It was getting too heavy. "Let's have it straight," Manda said. "You put me into this thing, and maybe I get snatched to . . . well, wherever . . . and maybe I get cured."

"Stripped to essentials," Prof. LeClair agreed.

"Then, do they send me back? Or do I have to walk?"

"That is not stated. I should add, perhaps, one of my colleagues with a beastly sense of humor has suggested that these . . . whoever they are . . . want a person whose removal from our . . . milieu . . . would have minimal impact, whom they can dissect. It is, I must admit, an equally reasonable scenario."

"Shucks, I was just getting interested." She switched to Dr. Briscoe again. "I'm too grown up to get shipped to Disney World, huh?"

His reply was a pained look. Manda grinned.

"Hey, I got to make jokes," she said, and challenged his eyes. "You want to put my name in the hat. That it?"

"That has been done. A case such as this, it was thought best to proceed without informing potential candidates. We did not want to raise unwarranted expectations."

"It's mine that got pulled out?"

Dr. Briscoe's gesture seemed to shrug the question aside. "The committee's first choice was an eight-year-old boy, premature aging syndrome. He gave it up early this morning. You were second on the list."

"You mean he died," Manda said, defiantly flinging the word. "Every time you dodge saying it, it sticks out twenty miles. Just makes it more awful."

He allowed a guilty nod. "Some of my patients are more sensitive."

"And just because he lost," Manda said, "it's not fair to say gave up.

There's nothing bad about losing, long as you don't give up. Look at our football team."

"She has a point, Doctor," Professor LeClair said.

"Doormats of the middle west. Always try, always lose." Dr. Briscoe smiled ruefully and reached for a folder. "All right, Manda. If that's your answer, we have some papers for you to sign."

Then that biological specimen at the *Record* picked up on the rumors and nosed out the story. What he wrote made her some sort of present day Joan of Arc, which was silly. All she wanted was to stay alive.

"When container in spontaneity resonates ear detectable tone," the message had said. That was three weeks and two transfusions ago. And no, her canines didn't look any longer in the mirror than they had been, and if she ever heard that ha-ha joke again she'd bite them in the neck!

Completely out of breath, hands shaky, she tried to lock her bike in the rack by the side entrance to Old Physics. Book bag on her shoulder weighed a ton. "Hey, Manda. Need help?"

Glance over the shoulder. Ken Something-or-other, one of Professor LeClair's grad students who was helping. He gestured to the beeper on his belt. "Headed the same way, I think."

She tried to get her lungs under control. Heartbeat too fast. "I'll manage."

He lifted the bag's carry strap off her shoulder, and suddenly she felt she might float off the ground. Firmly, she made the lock's clasp snap. Crazy; she could keel over, die right there, but she didn't want her bike ripped off. Turning, she reached to take her bag back.

Ken was hefting it by the strap, arm's length. "Weighs more than you do."

"Does not."

"Stocking feet," he said firmly, slinging the strap onto his own shoulder. "Remember? I've got you to the nearest gram." He opened the door. "Here. Let's move."

It was stand and argue or go with the flow. He followed her through and down the concrete stairs. Scuffy, vacant echoes in the stairwell. Fire door at the bottom that hissed when he opened it, and hissed again as it swung slowly shut behind them. Ahead, the Spartan corridor reached far.

"You OK?" he asked.

She pushed away from the wall. "Hurried too fast," she admitted, mad at herself; maybe a little at him, too, for noticing. "Excited. Wouldn't you be?"

Tell 'em you're weak and they'll chase you forever. Worse yet, coddle you.

The corridor echoed to their scuff and footfall. Ken seemed to have run out of small talk, and the big thing felt too ominous to talk about. "There's a note in my purse for my folks, in case it gets messy," she said. Nod to the book bag where she'd crammed it in. "One for you guys, too."

Anything to fill the vacuum.

Ken wasn't looking her way, might not have seen. "Told 'em . . . well, what we're trying?"

"Sort of," she said. Breath coming back, a little. "Crazy gamble, but nothing else seems to work, so why not? They've got so they don't want to hear the details any more."

"Can't really blame 'em."

"I don't. They didn't ask for this, either."

Up ahead, someone entered the corridor from the other end and disappeared through a doorway. "Alan," Ken mumbled, frown in his tone. "But he's A team."

"Would you skip it, just 'cause it's not your shift?" Manda asked.

Caught, Ken chuckled. "Not if I had druthers."

"So?"

"All right. So we're all a bit hyper." At the same doorway, his feet slowed. "Wait here. I'll get your stuff."

"I can . . . " But she did feel worn down. Excitement. Too much hurry.

Ken went inside, unslinging the book bags as he passed through. "Look what I found," he was announcing.

Faces inside turned to look. "Manda," someone said. "Hey, kid!"

Too many in there; looked like all of A and B teams, about half of C. Manda smiled and danced her feet. "Hi, guys."

Ken came back out lugging a parti-colored bright nylon sport bag, not much heft. She reached to take it, but he held it back. "I'll walk you down," he said. "You don't look right."

"I look like this all the time," she said. "Comes with the territory."

"Uh huh." But he didn't surrender the bag.

At the corridor's end, another corridor came in at right angles. The plain door of the ladies room was first on the left. Finally, he let her take the bag.

"I'll wait here." He seemed uneasy. "If you need help, yell."

Afraid she'd pass out, or something. Well, it could happen; not because she wanted, but . . .

Give him straight eyes. "What if you think I'm taking too long?"

He looked embarrassed. "Should have anticipated . . . " he mumbled.

She forgave him with a grin. "Nobody thinks of everything. I'll be quick." She ducked inside.

Absolute minimum mass, the message had said. "High energy requirement per unit mass quadratic increase per unit to beyond equipment capacity," it had said. Woefully inspecific, Professor LeClair had complained.

Therefore, off with the sweater, blouse, boots, socks, and bottom hugging jeans, the bra that nice girls wore even if they didn't need it—everything. That included wristwatch, the fire opal ring she got for her eighteenth birthday, her earrings, and the medic alert medallion that looked like a charm which she wore on a gold chain around her neck. Fingernails already trimmed, and no polish. Toenails, too. Scrub off her makeup. Taking too long.

Tile floor cold to her bare feet. Not exactly warm, the rest of her. Everything into the sport bag, then dress in the clothes they've reluctantly allowed. (Fifty grams? I'll go on a diet, lose that much. Deal?) No, empty the bladder first (have to, anyway, all the anxiety) and hope Ken doesn't think you're taking too long, and then get dressed. Green hospital scrubs, one size fits anyone, sort of. But she'd taken in some seams, cut off the pantlegs above the knee, and sewed up the wide open throat so it wouldn't reveal that she hadn't much to show up there. Check the mirror to be sure she looked ready for anything. Floor still cold, so she shoved her feet back in her boots.

That mirror. Sudden impulse made her scrounge deep in the sport bag. Yes, the lipstick she never used much in the pocket of her jeans. Great.

On the mirror, big letters, she wrote: "MANDA CALLAN WAS HERE." Maybe they wouldn't wash it off for a few days. Now she could go.

"You look great," Ken said when, suddenly feeling timid, she stepped out. Trying to make her feel good.

"Look like a monkey, and you know it."

"A good looking monkey," he said, trying to infect her with his grin, and took the sport bag.

Small talk failed, all the way back around the corner.

The monitor booth was full of guys, most of them talking with much punctuation of the hands, most of them standing because there weren't enough chairs. Also too much equipment with dial faces and screens with wiggly graphs on them, thick and thin wires hanging out everywhere. Ken let the door swing shut. "Way for the star of our show!" he yelled into the babble.

Conversation stopped. A path cleared. Professor LeClair stood with his back against the wall. "Are you ready?"

"It's never a good time," Manda said, chin up.

"We'll be monitoring," he said, nodding around, "everything we can. As long as we can."

Which couldn't help an awful lot. Here wasn't where it would happen. Whatever happened. "Let's get on," she said impatiently, and kicked off her boots. Then, "No. Where's my bag?"

Someone dragged it from under a table loaded with electronics; they intended to measure everything, including the decibel level of her screams, if any. She got it open, rummaged in her purse. Screams? Not on your life.

The dice were down in the bottom. Well, wasn't everything? She found one, then the other; didn't bring her hand out till she had both. Nudging the bag inside, she rolled them on the table.

For a moment, gut-felt shock. "Snake-eyes!" She covered fast. "Great! Now it's gotta get better! Let's go."

Already she was turning to the inner door. The solid one. Ken reached for the locking bar. "Sir, mind if I . . . ?"

One of the other guys had been drifting to the door; his task, B team's shift. Now—a glance to Ken—he paused.

"If you wish," Professor LeClair said gravely.

Ken unbarred the door and followed her down the steps into the sunken chamber where the refrigerator thing hulked, chrome shiny under a sweat of condensed moisture. Blocky, rectangular, twice her height, it hummed an endless, reedy tone like a big electrical transformer under high load. She looked up; it made her feel twice as small.

"I thought your job was the . . . the passive radio emission stuff," she said. Anything to say.

"Did a trade," he said. "Somebody's got to lock you in. Might as well be me."

"Why?" she asked.

He didn't answer, and she wondered if it was chance that he'd turned up just as she was locking her bike.

"It's air tight," he said, having waited too long. "Nuff to breathe maybe twenty, thirty minutes. Guy who locks you in, it's his job you don't stay in too long. Be pretty damn stupid to—"

"I thought all that was planned out."

"It was. Lot of other things, too. Easy to lose track, whose job is where. Got me?"

"I think so." Not entirely sure, though.

"And if you start feeling . . . well, wrong, bang on the door. Maybe nobody else, but I'll be listening. All right?"

"Looks sort of thick."

"Transmits sound real good. I checked." Straining on tiptoe—funny, she'd thought he was taller than that—he slipped the upper bolt, then the one lower down. He swung the door open. "Ready?"

She forced a grin. "No. But let's go."

Planning everything, they still hadn't noticed the compartment was a high reach for someone her size, and a tight fit. Needed a boost, and then more help squeezing inside. "Hey, careful with the hands, guy."

"Sorry."

He looked so hurt, and he hadn't actually . . .

She snarked him a nose. "Just kidding. It's all right." Quickly then: "What's your name?"

"Ken." Abruptly diffident, like a kid caught embarrassed at something.

"I've got that part. I mean the rest."

Hesitated. Swallowed. "Hafter," he mumbled. She repeated it, question marked, to make sure she heard right. He nodded.

She hugged her knees. "I'll remember." All the reward she could give. "Thanks for keeping my head busy."

He reached up, squeezed her hand; the wrong one, but that was all right. "Luck, kid."

She squeezed back, eyes to eyes. "Same to you."

His hand dropped, then he looked away and closed the door. She listened to the bolts snick home. Suddenly cold in there, and terribly alone. Should have thought to breathe deep. Too late now.

She wished that keeny, endless noise would stop before it drove her crazier than she was.

Then it did stop, like off a cliff's edge. She'd been letting out a breath, wondering how long, and feeling the thing's chill seep into her back, bottom, and the soles of her feet. Suddenly the drone wasn't there. Her breath stopped, too.

And she was tumbling, and might have been tumbling for some time; tumbling forward and sidewise and whirling around and maybe other ways her senses couldn't feel. Had she gone to sleep? And dreamed? And woke in terror like you did with bad dreams without knowing why? She banged a fist on the door—hard to get a good shot in this cramped space with it pressing the shoulder. 'Nother thing nobody thought of. "Help!" she yelled. "Help!"

No one came.

The tumbling and whirling went on without end, and it was still cold in there. "Let me out!" she yelled. "It's not fair!" Her own voice reverberated in her ears. No other voice replied.

How long. . . ?"

. . . . and she remembered Professor LeClair's grad students—maybe Ken?—when they were cramming her full of things to ask and look out for if she got the chance. They also talked about orders of infinity and probability waves and whether, accelerated to the speed of light, a person would feel the passage of time or whether there would be no sensation of time while time existed everywhere but there, except that it would not be one place; might be all places, or might not be any places at all. What if you open Schrödinger's box and the cat's not there? Crazy, right?

Should have let her keep her wristwatch.

The tumbling slowed. How she knew she wasn't sure. Maybe she was wrong. Maybe she just wanted it to end, and therefore . . .

Not tumbling now. Weight steady under her bottom. Chin could rest weight on her knee. Still cold in here. Shivery cold and dark.

Wait? She tried banging the door again. The sound was a dull bump, not very loud. "Hey! Anybody out there?"

Silence answered.

Maybe if she cried. No. Grit your teeth. Don't cry, ever, even if that's how you feel.

The bolts snicked back. First the upper, then the one lower down. The door opened wide, no sound, and there was light hurting her eyes. She squeezed them tight, then gingerly opened them again. A white glove, seamless fabric of some kind, too close to focus on; somewhere beyond, a head wearing a hood of maybe the same material with silvery patches where she supposed eyes should be. Shoulders and arms and chest in the right places, too, and similarly clothed. No seams anywhere.

"You a ghost?" Manda asked.

"I greet," it said. A man's voice; hood didn't seem to muffle it, but the words had an awkward sound. "Fear not. Come out of?"

Manda began to feel better. The air had a faintly sweet scent, like the antiseptics they sold to people who disliked the stink of ones that could do what they advertised. She unfolded and slipped down. After the refrigerator's chill, the floor felt warm. She adjusted her clothes and looked at the man. "Now it's your move."

"Move?" He sounded puzzled. "Later, you will explain. Now shall I your designation ask."

Took a moment to work through that one. "Name, you mean? I'm Manda Callan. Who're you?"

Something about his posture and stillness. "I said something wrong?"

"That is you? Identity? Exact?"

Trouble with the language, like talking to a foreign student. "Well, officially it's Amanda, capital A, pronounced *uh*, only most people swallow it. Amanda Mary Callan. What's yours?"

"My designation? You shall identify me, Speaker. That is adequate to needs. I ask why you present your own that other way."

The curiosity he expressed was honest and real. "Just about every girl plays around with her name," she explained. "Something about self-image. We want to be different." Then she thought. "But not too different. Are you human?"

Speaker was silent for a few too many heartbeats. "Word is several things," he said slowly. "Should you mean, originating out of same chemophysical cascade as self, reply affirmative. If meaning be other, clarification required."

His words were English; she wasn't so sure about the language. Well, go for broke. "Are you a doctor? There's something wrong with my blood."

"Doctor." From inside the hood, it sounded like an echo. "Meaning is various. Explain."

"Someone who helps sick people," Manda said. "Well, tries to help. Miracles are a different department. I'm hoping you are, because I—"

"Knower of exotic communication, I be," Speaker said.

The information stopped her tongue between one syllable and the next. "Snake eyes! One last chance, and we blew it!"

Well, she expected it. All her other breaks had been bad.

"Meaning is obscure," Speaker said.

Hard to look him in the eye with his eyes hidden inside the hood. Manda did her best. "We hoped you'd be a doctor, 'cause that's what I need. Why'd you ask for somebody sick, if you're not?"

"Information not permitted to give," Speaker said. "Now, contaminating you are." A thumb somehow included his entire garment, hood to toe. All one piece; how'd he get into it? He stepped aside, the movement making her aware for the first time of the room they were in.

Not much to see. Maybe ten feet across, plain light beige walls all around, a circle, and bellied outward like the midsection of a sphere. The floor, a glossy deep maroon, almost the color of dried blood, and blood-warm to her bare feet, which disquieted thought. Where floor met wall, a deep slot all around. For scrubbing out the blood, she wondered?

Ceiling the same, except it was off-white and milk-colored light seemed to come from it. Same kind of slot up there, too.

Across from her, where Speaker's body had blocked the view . . . well, she supposed it was a machine. Maybe not, though. Pipes or cables or maybe just rods underneath, and a heavy-looking platform the creamy white of alabaster all around and obsidian black on top. Suspended over it like an open hearth's hood, a nearly perfect mirror image.

But for that, the room was featureless.

"Garment off," Speaker said. He hand-waved toward the machine. "Lie down."

Manda didn't move. Sacrificial altar? Dissection table?

"I want to go home," she said.

"In sequence, will happen,"Speaker said, a soothing tone.

Yeah. Sure. That's what they tell lambs at the slaughterhouse. Manda's feet stayed where they were. Guys were always trying to con you.

"Is necessary," Speaker said. Then, as if knowing her mind, "Is no pain. No damage. Good."

How can you read a face when it's under a hood? This guy owed her nothing; could be lying and grinning all the while. A wary glance this way, she padded across the floor. The dissection table's surface looked glossy smooth; it yielded to a fingertip like mercury, but not the same gelatinous surface tension. Queer, but she didn't know more than she had. She turned back to Speaker; he hadn't moved.

"It doesn't hurt?"

"All meanings. No," Speaker said.

Well, she'd come this far. If it ended here, it ended here. She wouldn't cry and she wouldn't scream.

"Garment off," Speaker reminded.

That made her hesitate again.

"Necessary," Speaker said.

Standoff. Oh, all right. She had to suppress a silly giggle. "Where I'm from, a man doesn't watch while a girl takes her clothes off. Look at the wall for a while."

"Ah," Speaker said, and complied. For the first time, he sounded amused.

Quick, before she had time to think. Top and bottom, whip and whip. Nowhere to put them. What's wrong with the floor? "Now you can look."

Speaker turned.

She wanted to put a rock through his window. "Do I look all right?"

"Not mature," he said.

If that was all the reaction a nekkid girl got, how did people here reproduce? Maybe they grew babies in bottles, but if that was how, why bother?

Well, so maybe she did look sort of like chicken wings. "What you expect? You're what asked for somebody small. Anyway, I'm older than I look. I've been sick." Quickly then, because if she took time to think she'd want to run and scream, she hitched up on the . . . the dissection table, took a breath and swung her feet up; the stuff of its surface gave way like thick oil under her bottom and back and shoulders and heels, and the hood hanging over her was full of—it looked like—the same stuff, and she wondered . . .

"All right?" she asked.

Speaker approached, and it felt too much like the bad late night movies where people were evil because that's how they were; and she had to keep from laughing but she didn't want to yell.

"Palms down flat," he said. "Head back. Eyes should be open. Also other openings. Muscles loose."

She tried to comply. The . . . oil? . . . felt neither warm nor cold. "You're sure it won't hurt?"

"Decontamination, some persons take for pleasure," Speaker said, and his voice held a soothing warmth like her father's. He reached up a hand, and the hood started down.

"Wait. How do I breathe?"

"That shall be not a problem," Speaker said, and the hood continued down to wrap her in warm darkness.

It melted into her, whatever it was. Or maybe she dissolved in it. No way to be sure. All she knew was that she couldn't tell where her skin was and her tactile senses extended outward into a blur. Like mist, smoke, a halo of light. Maybe that's what death was; she didn't know. She held her breath.

And something was in her body, pouring slowly through like thick oil, warm but full of small sharp things, like snowflakes, but snowflakes were cold. Like fireflies small as atoms, each flaming fiercely but cool, icy bright. Something tasted of salt and sweetness, and the scent of a million flowers on a summer day mixed with the dead things washed up on a seashore at the end of a storm. Sounds like music, violins and drums. Auroral glows rippled past her eyes commingled with myriad sparks the color of diamonds in the sun, emeralds, rusted iron, and gold. Each braid of her body was unfolded and touched with a smooth and glistening wetness that warmed and excited and gave feelings like she hoped a really fine guy would give her some day. She wanted it to never end. She didn't need to breathe.

Then it all went away.

She woke, unsure if she'd slept or what had happened, and Speaker towered over her. He gestured her up and gave a hand to help because the surface she was lying in gave nothing she could push against; a strong and reassuring hand. She laughed at the greasy slickness of the stuff containing her, or possibly for pure joy.

"That was nice," she said. "Can do it to me any time."

"Excessive use not recommended," Speaker informed.

She worked herself over the edge. Dropped down to her feet and bent to retrieve her clothes. "Can I . . . ?"

"No," Speaker said instantly. "Contaminated. All here is. Quickly come." A gesture indicated a circular opening in the curved wall beside the hulk of the refrigerator thing. Had it been there before? She hadn't noticed.

Just like in the hospital, she thought. Take your clothes and make you go wherever they want, and for all you know they might be selling tickets. Well, she'd played that game. Speaker hadn't moved; that meant she was supposed to go ahead.

Her skin still tingled from whatever the machine had done, and yeah, she could feel little things still moving around inside. Sparkles, like fizzwater. Something like that could get to be popular, but she wished she could have her clothes back. "Where are we going?"

"Your quarters, while you are here, this place," Speaker said, and motioned her again to proceed. "Quickly, or you recontaminate. You have breathed this air."

Really bugs about that. Well, he might know things she didn't. The opening gave to a passageway, tubular but with a flat floor, scuppers at the edges like the room. Looked like it opened out maybe ten feet along. She glanced back over her shoulder. Speaker was following a stride behind. "Hey, what year is this?"

Suddenly millions of needles transfixed her from all directions. "Eeek!" She stopped, and for an instant she was drenched all over, even to the roots of her hair, and her eyes streaming. Then it was gone and she felt as if, momentarily, she'd been slathered with mint ice cream.

"Oh, I get it. More decontamination. Right?"

Speaker came through the spray. For a moment thin mist swirled around him. It went away. "Quickly you understand. That is good." Reaching up, he unscrewed his hood, then his gloves high up on the forearms, wadded all three into something thimble sized which he shoved into an invisible pocket. She still couldn't make out where the seams had been.

"Understand also, this was required to protect you in addition to myself."

"What I've got isn't catching," Manda said.

A slight frown puzzled the dark brow. The top of his head was bald but the hair on the sides was ink black. Very ordinary brown eyes. A solemn mouth. "Catching," he repeated. "Explain."

She told him about communicable diseases. Didn't he know? Then she explained about autoimmune problems, gene deficiencies, and cancer cells. "Ah," he said. "Defects."

"That reminds me," she said. "Mine's a blood problem, and I've been squeaking by on one transfusion after another because I can't grow my own, and I was due for another refill four days from now." She laughed. "Like a returnable bottle. How do I get there from here?"

"Day," Speaker said. "By that you mean single rotation of a global body. True?"

She had to think a moment. "It's the Sun comes up and goes down and then it comes up again. Or maybe the Sun holds still and the world turns to face it like on a rotisserie."

"You do not know which?"

"The second way's what they tell us in school, but when I get to college they're not so sure. Nobody ever proved it to me."

The solemn mouth became a pleased smile. "Wise," he said, and nodded her onward. "Actually, it is neither."

Her feet wouldn't move. "Care to explain that?" she suggested.

"No," Speaker said. "I have said too much. Let us proceed."

She gave him a look as if he'd suddenly switched to talking Choctaw, then shrugged and padded on to the passageway's end. The room there appeared a perfect copy of the one they'd left except that it was empty. Globe section wall all around—the opening to the passageway was gone the instant Speaker stepped out of it—floor and luminous ceiling with scupper slots all around, all bare as her backside. "I'm supposed to stay here? There's not even a window."

"We must limit information you receive," Speaker said.

"You know what a window *is?*"

"A transparent partition through which can be seen what is beyond, or an opening without the partition which permits the same or passage through."

"So what's wrong with that? 'Fraid I'll see people undressing or something?"

She could see him work through the question. "Desire for window is exotic to us," he said. "Chamber not fitted to allow. To the directional committee I shall inquire."

Manda knew evasions when she heard them. "Meanwhile, how about some clothes? Girl's sort of at a disadvantage without. Hey, I'm starting to talk like you."

"My knowledge of the . . . the English . . is not exact," Speaker said. "I would welcome you instruct when I say wrong." He pulled down a shelf from the bare wall; it conformed to the wall's curve. Folded somethings of many colors lay stacked in neat piles. "Garments."

She went over to inspect. All the same utilitarian style, a quick glance showed; pullover shirts and stretch-waist pants of a fabric that didn't look woven, but didn't look like bonded fiber, either. Fluffy soft, and no seams. And the colors! Greens and yellows, iridescent reds and sizzling electrical blue. Bold patches and swirly mixtures and criss-crossing stripes and . . .

She snatched a shirt out of a stack—glittery sapphire with a yellow streak, shazam, zigzag across—pulled it on and wiggled at its slinky feel and how it clung without confinement. Hey, these guys could make a fortune! Pants? That glossy black with silver trim. Ecstasy! "Where's the mirror?"

"Mirror?"

"What to see what I look like. Don't you know anything about girls?"

"My commission, in the midst of other items, is to observe and learn," Speaker said with unruffled calm.

She tried on three or four combinations. Let him watch; he'd seen all there was; this was fun. Lack of a mirror . . . who cared? Too bad they were all the same style, though with all those colors to choose you could lose track of that. And maybe she could raggedy rip off the sleeves and legs from some, vary lengths, and do some tricks with the necklines, maybe a fist-grab out of the butt, off to the side, which was considered daring but coming into style, only you had to be careful about the underwear then; that didn't seem to be a problem here, because apparently they weren't giving her any.

Speaker had obtained a comfortable-looking chair from someplace—dared she ask?—and quietly sat. The shelf, how it had opened down from the wall—with a curve?—she couldn't figure. No hinges visible. And all these great clothes?

"How long are you keeping me here?"

Speaker appeared to ponder. "I presume you refer to duration," he said. "Regret, I do not have terms of measurement."

Huh? "Hours? Days? Weeks? Months? Years? If you don't do something about my blood, it's silly to talk about."

"I can say nothing about your blood," Speaker said. "As for duration, we do not measure in that frame of reference; translation would therefore be difficult, perhaps not intelligible. My skill with mathematical things is undistinguished."

"Well, if it's more than a week, my blood's like Cinderella's pumpkin. I'm running on empty. You hear what I'm saying?"

"If the question becomes significant, I shall inquire to the directional committee."

He sounded like the university administration. Stonewall, and don't know nuthin'. "What year is this?"

"Year," Speaker repeated, as if to thumb through a dictionary. "That is the duration in which a planet, in the old nomenclature, would revolve one time around its principal source of radiant energy; alternatively—again the old nomenclature—around the dominant center of its local configuration of cosmic lines."

Choctaw time again. Either he didn't know what she meant, or she didn't understand. "How do *you* measure time?"

"Time? I presume you mean duration. Time is several things. Duration is one aspect, but time describes also the virtual displacement between two sets of spacial coordinates—cosmic lines—and also the actual displacement of a single such locus from one absolute position to another. Absolute position being defined as the locus of a photon which, being without duration, is considered motionless." He seemed puzzled.

"I think I got off the bus about three stops back," Manda said. "All I asked . . . look, you've got me here from where I was before, and I want to know how much time between then and now. Or maybe you'd say it, what's my . . . my displacement?"

"Ah," Speaker said, as if comprehending at last. "I am told that can be expressed as either infinity, positive or negative, or zero."

"Or anything between," Manda said sarcastically.

"No. I am told the equations are very clear on that point, that all other solutions involve the square root of negative one, being therefore meaningless or external to the Universe. Regret, that is outside the reach of my skill to explain."

"You're right about that," Manda said, exasperated. "So I'm stuck here." She gestured to the clothes shelf. "How'd you do that?"

He showed her and, in the process (he said), imprinted her neuroelectric emissions into the chamber's sensors. By the time he was done—the duration, that is—she could summon forth not only the shelf with clothes, but also a shelf of unitized meals (which, where appropriate, were hot or frozen on the breaking of their seal, and no, she couldn't send out for pizza), an assortment of chairs (hard or cushioned; reclining or upright), stools, benches, and tables (various shapes and sizes of each), a mattresslike thing for sleeping that was bouncy or yielding or hard, however she wanted, and bathroom fixtures which were strange but quickly gotten the hang of. Wastes simply disappeared, and the shower—well, it sort of resembled a shower—gave whatever kind of bath she wanted, soak or flow (never mind the tub stood up on end, regardless), hot or cold (with choices of fluid and viscosity, and from foam to waterfall) and a selection of soaps, unguents, lotions, shampoos, and scents. She had to try it; if he felt like watching, who cared?

Like daddy when she was small.

Speaker resumed his chair. "Now," he said. "Things you should know."

Manda perched on a padded stool, feet tucked up under, chin on thumbs. Dazzled, but hungry for more.

"As you know, you have been displaced from previous locus to this," he said. She nodded; never mind the details.

"Is secondary consequence of experiment in realm of cosmic understandings. Your language would say, perhaps, science, but that concept has become degraded, and was ever imprecise. Because experiment entailed great expenditure of energy and other resources, and the risk of terrible consequences besides, it could be done only once. Consider yourself privileged to be part of."

Manda stirred. "If it wasn't for the honor, I'd've rather walked. I mean, if you can't do something about my blood—"

Speaker's upraised hand silenced her. Universal language. "When a duration has elapsed, you shall be returned without harm. It cannot be done, though, before certain gravitational fields, the cosmic lines, have arranged to an optimum configuration. Meanwhile, I have been detached from my subject of knowing to be your companion, inasmuch as I shall be able to communicate whereas others would lack the ability."

Saying things between the lines? "Well; if you're planning to sleep with me, I had other plans." Among other things, in the absence of anything resembling pajamas she'd already decided to sleep bare, which was delicious anyway; but you had to be careful who found out. Some guys got turned on by the weirdest things.

As if hearing a nuance not fully recognized, Speaker tilted a questioning brow. "That is activity privately done," he said. "I am given own quarters, similar but apart. Does that address your concern?"

Manda nodded. "Go on."

"It was necessary at once to cleanse your body of all nonintrinsic organisms. What microbes you might have brought with you we could not predict; to you, are possibly harmless, while to this self and all at this locus, possibly deadly. Rapidly deadly. You have spoken of infectious illness, so I presume you know our thoughts on the matter."

"Sort of. But, like I told you, what I've got isn't and besides my immune system's konky as a four wheel bomb with the fenders rusted, so they've had me tanked with antibiotics to the ninth, and antibiotics against the antibiotics, too; or whatever you call them. Could be the guys on my side thought the same way, and why I got the green card stead of someone with malaria or . . . or typhoid. They didn't tell me much about that." She made fists of her hands, to rest her chin on more firmly. "So that's why all that decontamination stuff, right?"

Speaker acknowledged. "And why this self-protection wore. Here, now . . . " His nod encompassed the chamber: ". . . we are in fourth level isolation. Infectious agents exist outside which—we cannot predict without detailed knowledge—could be fatal to you with extreme quickness. Each time I leave you or return, I must go through decontamination myself. While you are at this locus, you must be kept contained."

"Why'd you ask for somebody sick? I mean, you're taking a bigger chance getting someone that's . . . " The word stumbled at the tip of her tongue because it wasn't something she planned to do. " . . . that's dying. Aren't you?"

For all his reaction, she might have been talking about the crackle glaze on Chinese pottery. "Judgment was, we should be able to deal with that risk more easily than they from who you came. And that you, being in the direction toward fatality, would be put to no large increase of danger. Not so?"

"I guess." Letdown was like a pimple where it chafed but didn't show. Well, she'd not show it. "What you're saying, I can't go outside."

Speaker appeared pleased she understood. But . . . "There is additional reason," he said. "Because you shall go back to previous locus, we must limit profoundly the information you take back with. Already, several moments, I have overstepped, telling you items dangerous for you to have. Other items you shall have observed. It cannot be avoided. I must caution you, therefore, upon your return, that you communicate as little as ability permits to other persons. For your own welfare, and ours."

This adventure was starting to feel like no fun. "How come?" she asked.

"Meaning?" Speaker prompted.

To her it was obvious. "Well, why? I mean, what's the big secret? All you've done is show me things I can't figure out and get me confused. What's so terrible?"

Speaker was silent a while, clearly gathering thoughts. "A result-of-cause relationship exists between your locus and this," he said finally, with care. "A pyramid of consequence. Should you, returning, do a thing or speak information which does influence thought or action by others, which would then make difference in a wider circle of acting and responding individuals, the consequence would enlarge and extend to infinity. One consequence would be that this locus would fail to exist, this self of me would not exist, and you could not have been displaced to here. The configuration of the Universe would be altered. Therefore, such recursions must be forestalled."

When she was small, Manda had taken apart a perfectly good windup clock and failed to figure out what all the parts did. In high school, she'd dissected a frog with the same mystification. Mr. Tompkins's explanations left too much unexplained, nor had the lab manual helped. To begin with, there was the difference between a dead frog and a living one, and it wasn't like a clock you could just wind up and it would tick again. Taking apart what Speaker had said was like dissecting the frog.

"You're talking a high gain feedback loop." She, too, could reel out the Choctaw. "Like they crank up the amplifiers till they squeal."

Speaker shifted into meditation mode. "Subtleties escape. Later, you will explain this feedback loop and high gain. Presently, I wish to establish that—"

"Oh, I think I get it," Manda said. "We read a story in high school about a guy who goes back in the past to shoot a dinosaur which was going to get killed by a falling tree branch a second or two later, anyway. But he also steps on a butterfly, so when he gets back to his own world—time, I mean; locus?—things are changed. Because of the butterfly. I thought it was a dumb story."

Speaker frowned. "The fundamental concept is not incorrect."

"Maybe not," Manda admitted. "But it was too much 'this thing changed that thing' one to one, and the people didn't talk like real people or act like real people, and a tree branch—to a dinosaur, that's a toothpick!—and the guy who wrote it tried too hard to write it cute, besides. 'Look ma, no hands!' That sort of thing. It was like reading a comic strip, and Miss Zukolsky talked a lot about metaphor and imagery and archetypes and symbolism, and I sat there thinking what a stupid story it was.''

''Nevertheless . . . '' Speaker said.

''Oh sure. Anything I do makes other things happen down the line, so . . . so if I'd had a hot fudge sundae instead of sticking to my diet, they might not have let me have something to wear, and I might have told them to stuff it, and they'd have sent someone else. I'm not sure where it goes after that. What was that business about who I am? I'm who you expected?''

''I am told it would resolve an uncertainty in serial-recursive verification theory,'' Speaker said.

''The *what?* Wouldn't care to explain that, would you?''

''It is not in the range of my knowing,'' Speaker said. ''And comic strip; that also I shall want explained when we are done with these preliminaries.''

''Well, better hurry, then,'' she said. ''I suppose that's another reason you wanted somebody sick. I won't have much time to go step on a butterfly I wouldn't have stepped on if I hadn't been here. Personally, I'd rather have Disney World.''

''Disney World,'' Speaker repeated, as if adding to a list.

''Forget it,'' Manda said bitterly. ''What you're saying, you'll keep me cooped up and won't even tell me the time of day, and won't do anything about my blood, and you're all I get to talk to, and I suppose it's really why you won't give me a window. Disney World would've been more fun.''

''I shall inquire to the directional committee about this window item,'' Speaker said. ''That may be possible. And if you have other needs which are reasonable. . . . ''

''I'm going to be here a while?''

'' 'While' is inspecific. A duration of moderate extension is perhaps . . . ''

''Then I'll need a toothbrush. I forgot to bring one. And you got any psych texts? There's a paper due, and an exam coming up which I better not miss, and—''

''Syke texts,'' Speaker echoed, ploddingly entering it on his list. ''Tooth brush.''

Duration elapsed. Whether her days, as measured by her sleep and waking cycle, were twenty hours long, or thirty, she could not have said. They might have been various. On campus, the clock was a thing to be cheated; you caught up on sleep when vacation came.

Speaker would arrive each day through an opening which appeared in the wall, same as the furniture; he would depart the same way. All other times the wall was solid; for her it stayed solid. She tried.

After the second morning, when he caught her brushing her teeth, still bare, he learned to knock before entering. A gentleman did that. Though puzzled, he accepted her rule. He was, she had to admit, an all right sort of guy.

He wanted to learn about her language. Knowledge of the locus she had come from was fragmentary, he said, and the opportunity her presence gave was to be taken full advantage of. To her warning that how she talked wasn't exactly how a lot of others did, he was indifferent. The basic rigidities, he explained, were known to a modest degree; the freedom taken and the flexibilities employed provided marvelous latitude for scholarship. Therefore they would talk; he would listen with both ears.

And scholars in related areas of knowing had, it seemed, unlimited thirst to know more. Speaker had a domino-sized talisman that he consulted when their conversation lulled. Never did it fail to supply new things to talk about; she hadn't realized that she knew so much about the world.

Not that she knew everything. She was, after all, still in school. She knew about cars and airplanes and sailing ships, but only vaguely how they worked. Of nuclear science, electrical power grids, satellites, and biotechnology, the same. Television and computers, to her, were magic boxes . . . well, like that talisman thing. Meteorology and organic chemistry were mysteries served by acolytes as strange as Shinto priests and Buddhist nuns.

Of her times she knew a little. Having taken history, she could prattle about the Greeks and Romans, the Napoleonic wars, that mysterious thing called the Renaissance, the British Empire, and the world conflagrations of the twentieth century; less confidently she told about faraway places like New York and Boston, the Middle East, and The Bay. As for events, she knew virtually nothing of regional wars, international trade and the significance of Japanese imports, riots in Africa, or South American ecological destruction; she'd heard of them, that was all. She could, however, talk for hours about rock musicians, hunk actors, women's tennis, and clothes; and, more locally, she could report the whispers of which coeds would take their exams on a mattress, what fraternities she should stay clear of, and what guys a girl should be wary of being alone with. Profs likewise.

Medicine, well, she knew a bit more. With that she was sort of involved.

On the fourth day (or had she lost count? Days were starting to feel all the same) she reminded him about her blood. "I'm not making my own now," she said. "I was getting transfusions, but the blood doesn't last more than two or three weeks at the most, and they were sort of topping me off with a fresh pack every eight or ten days, like oil in your car if it's burning too much. If I miss—I mean, sometimes they couldn't find some that matched—what I have starts to thin out. If I let it go too far, well, it's distilled water and that's . . . that *finis*. Know what I mean? And I've been a whole week, now."

As ever, Speaker seemed neutral. "The directional committee is informed," he said. "Your condition is monitored. Should need arise, I am assured the necessary measures will be done."

"You sound like somebody in the dean's office," she accused.

Speaker was unmoved. From one of his seamless, invisible pockets he produced a small, rectangular piece of scratched, cracked plastic. "Such artifact as this is profusely found in horizons close to your temporal locus. Random in trash deposits, they occur dense as trilobites, and where preservational conditions have been especially ideal, metal fittings are attached or associated. Careful study with conjecture suggests they were a portable device for creating small flames. My colleagues are puzzled they should be so numerous. Can you explain?"

Manda frowned only a moment. "Oh sure. Cigarette lighters. Throwaway kind."

"Cigarette?" he prompted.

She spent most of an hour explaining tobacco and smoking, the habit and what cold turkey was, and how cigarettes caused cancer and stained teeth and heart disease but people did it anyway. After which she had to tell about alcohol and uppers and downers and the wild sidewise stuff, and steroids and skydiving and Nintendo games. In his innocent, droll, dumb way, Speaker was a lot of fun. The oddest things completely snowed him.

And what, she wondered, did these people do for joy? Collect butterflies? Grab fast-track girls out of the past to ask questions?

After ten days, honestly worried, she brought up the matter of her blood again. Speaker dodged. "I am informed certain substances are being put in your food. The directional committee believes they should make stability."

"Marrow implants don't work that way. Besides, I didn't have any when I got here, so there wasn't anything to work from."

Speaker looked uncomfortable. "Have you been feeling a weakness? Some physical lack too subtle for the monitors to notice?"

"Well, no. Not actually. But . . . it's like measuring barometric pressure when you should be measuring altitude. What they need to look at's a blood sample; that'll show 'em. I get past the edge, it's a long way down."

"The directional committee is confident you shall be maintained for the duration you are with us."

"Uh huh." Manda didn't trust that invisible committee. "And meanwhile I'll get flabby from no exercise. That's almost as bad as no blood."

The next morning, Speaker unfolded from the wall an exercise machine of marvelous versatility. Not only the major muscles and limbs, but the tongue and jaw, the diaphragm, and viscera, eyes, feet, fingers and even some too personal to mention—which Speaker blandly proceeded to explain until, face burning, she made him shut up.

So all right. They wanted her healthy. Now, if they'd just do something about those washed out hollows in her bones! But she'd given up waiting for miracles long ago.

Funny thing, though; the exercise machine didn't get her out of breath. She tried.

"This stuff they're putting in my food. I can't take some back with me, can I? When I go?"

"No," Speaker said.

"And I don't suppose you can say what it is."

"I regret."

"When I stop getting it, how long does it take to wear off?"

"I lack information."

"Can you ask?"

"Knowing, I would be forbidden to inform," Speaker said. Manda grimaced and resolved to stuff herself; get what you can, while you can, whatever. "Well, I'll live." Then, correcting herself, "Long as I can. Any objection to that?''

''None at all.'' He spoke deadpan, his usual mode.

Getting information out of him was like digging for diamonds; something the size of a sandgrain to the ton. Direct questions went nowhere. Playing daddy's little girl worked no better, and games with her neckline—well, she hadn't much there—didn't even charge up his eyeballs. Still, she tried.

Was he married? The concept escaped him.

Did the people here find their babies under cabbage leaves? He was not permitted to discuss the matter—easy dodge, that one. What did they do for the pleasure of doing? Many things, Speaker said, none of which he could tell.

She called him a sadist. He calmly requested she explain.

Conclusion: these people knew about pleasure. Wings off butterflies, maybe?

Better luck came by catching the scraps he let fall. The directional committee was not a group of people but a thing composed of people interfaced with/by something that was not a person. (Big help!) The matter of a window was proving difficult for reasons he was not permitted to describe. (Thanks a lot!) Psychology did not exist as a separate science; its subject matter was distributed among biophysiology, programmed systems, epistemology, abstract art, and mathematics. (No wonder people went crazy!) Space and time, as she understood them, were aspects of a plenum having qualities she lacked both philosophy and words to comprehend. (That's news?)

One afternoon—by then she'd lost count of the days—she tossed the box that had contained her lunch (a bar of warm fibrous meat and a tube of chilled, sweet/sour-tasting globules) toward a section of wall that made it disappear. She emptied her cup (thin cinnamon tea?) and sent it after. ''Why me?'' she asked.

Speaker had been watching the wall while she ate. Now he unfolded from his meditation position on the floor which, for a male, should have been excruciating. (People *were* different, here!) ''Your question is not complete,'' he said, and acquired a lounging chair from the wall.

Manda sent the table she'd ate from back to its limbo, but kept the hardboard chair. She pulled her feet up; if she told him her toenails needed polish, would he know what she was talking about? ''You knew it was me that you'd get,'' she said. ''That means you've got some stuff with my name on it. I've answered your questions, honest as I can. Fair's fair. I want what you know about me.''

He received the demand with all the startlement of being asked to pass the salt. ''Information concerning the locus from which you were displaced lacks detail,'' he said. ''In sequential cause charts it is the equivalent of an asterisked notation. Detailed fact, for the most part, is unconnected fragments out of which conjectural inferences must be drawn; with my colleagues, for example, I discuss whether a thing called The Cold War was an event, a location, a political institution, or a philosophical system of uncommon persuasiveness. Clues exist to justify each interpretation; none is unequivocal. We have hoped you would—"

"Tell you what," Manda said; this time she wasn't going to let herself get sidetracked. "I'll tell everything I know after you're done telling me what I want? Deal?"

Speaker's mild nod warned that she'd probably made a poor bargain. All give and no take. "When the work that brought you to this locus was begun, the problem of consequent loops versus spirals was examined. They who have knowing of that specialization were not able to resolve the uncertainties. Therefore, I and certain colleagues in related specializations were consulted and a search through our data was done. Most, as I have said, is disconnected fragments."

"That's the excuses," Manda said. "What's the facts?"

"A mention was found," Speaker said, "of what may have been a displacement event. Your designation, Amanda Mary Callan, was shown among those number taking part. Whether you are in fact the person designated remains uncertain."

Speaker's talk had got better with practice; still, sometimes, understanding him was like looking for a pearl in a swimming pool of oysters. "You're saying it might have been me; it might have been somebody else."

"That approximates the concept," Speaker said.

"Well, I'm who you got. Did it make your . . . your specialization people happy?"

"I am not permitted to say," Speaker said. The words had a bleak sound; would he have liked to say something else?

"Well, if it helps, I'm me and there's nobody else with the name that I heard of. It's not like John Smith or Bill Jones."

Speaker pricked up. "Those are designations frequently used? Many persons?"

"Huh? Sure they are. Specially the John Smith. But look . . . "

Speaker leaned back. "A colleague has spent half his eternity unraveling the career of this John Smith. You say he is not one individual?"

"Almost sure not."

"He will feel destroyed."

"Well, sorry. But we're talking about me. I want to know—"

Speaker signaled her silent. "You say that where your designation is, the reference is probably yourself?"

To Manda, it felt more than sufficiently obvious. "If it's this . . . this mention about what you call a displacement, and it's my name, and I'm who's here, that means it's me, doesn't it? Next time I'll bring my driver's license. What's it say?"

"Your designation is one of the several who might have undergone displacement. Other aspects of the fragment can be interpreted as consistent with the work being done from this locus. That is all we have."

Manda puzzled it out, took it apart, put it together again. "Doesn't say what happened to me."

"I do not have that information," Speaker said.

Manda pounced. "You're saying somebody does?"

"I am not informed. Neither am I informed that information exists which I do not have. In preparation to be your companion, I encountered the suggestion that less than full knowing would be given me, for fear I might unluckily supply information that would affect your actions when you have been returned to your locus. That—I believe I explained—is not desired.''

''Uh huh.'' 'Tween the lines, he was saying that wheels turned inside wheels. ''So what's to stop me, when I get home, I go out and stomp on a butterfly? Just to spite you.''

''I do not know that you will not,'' Speaker said. ''It is possible that . . . '' Frowning, he broke off, ''The verbs of your language were not made for this usage. I say it may be what you shall have done.''

''I think I get it,'' Manda said. Freshman Comp hadn't covered the problem of dealing with two different ''nows'' simultaneously. This displacement stuff could get confusing.

''There is further possibility,'' Speaker said. ''A matter of concern. That as a consequence of your displacement, you might deviate from the path you otherwise would have taken. One possible result, some of our knowers say, could be that we shall fail to exist. Perhaps yourself also, having passed through this locus. It seems there is an ambiguity how the equations solve.''

They'd already talked about that, almost first thing. ''So how will I know what to do?'' she asked impatiently. ''What shouldn't I do?''

''I am given no information,'' Speaker said.

''That's not much help,'' Manda said. ''And when I get back, you don't know how long I'll live?''

''I do not,'' Speaker confirmed.

''Does anybody?'' She watched him. ''Days? Weeks? Months? Years? Centuries?''

He could have been a stone, for all the responses he showed. ''I am not informed.''

''So it's quick,'' she concluded, the mathematical part of her mind slamming doors on the part that yelled. ''Before I get a chance to change things. Or you guys wouldn't be taking the chance.''

''That is a possibility,'' Speaker admitted. ''One of many. I would point out, though, it is equally possible that, for our locus to exist, your effect would be required.''

''That's something you know?'' Breath stopped. She dared to hope.

''It is speculation that emerged in the discussion in which I took part,'' Speaker said. ''Suggested also has been that the branching and recombinant tangle of cause and consequence could produce this locus by many alternate possible lines. Were that true, your plus or minus might be noneffectual.''

Plus or minus? ''Well, it's sort of important to me,'' Manda said. ''Look, I'll make you a deal. Tell me what I should do, and I'll do it. Won't make a ripple, if that's what you want. Fix my blood. That's all I ask.''

''Merely for you to exist, I am told, could make a difference.''

''Is that an answer?''

''It is a speculation of possible relevance,'' Speaker said calmly. ''I shall communicate your suggestion to the directional committee; I doubt that he will respond.''

''So when I get back, I can stomp all the butterflies I want. Right?''

"I am specifically instructed to give you no guidance," Speaker said.

Manda tried, the thousandth time, to see behind his eyes. "You know I'll be pretty mad, don't you? Hate the whole world?"

"The fragment we have is not clear on the matter."

Manda frowned. Had he said something then, without knowing? "You've seen this fragment?"

"A summary. Part of a larger . . . call it a document. It is possible relevant parts have been withheld. I would not have been told."

Nothing to get her teeth into. Exasperating. "This . . . this experiment. What got me here. How much of it is me?"

Speaker paused as if hers wasn't the only voice he heard. "Explain," he said at last.

"You don't know what I'll do," Manda said. "You don't know what happens because I got . . . got displaced to here. You don't know if I'll make a difference or not. Somebody wanting to find out?"

"What others know, what they seek to know, may not have been given to me," Speaker said. "I am informed no more than you, and can tell you nothing. However, I can refer to basic rules; that is not how experiments are done."

"Oh? How *are* they done?"

Speaker stayed outwardly calm, but very still. "It is not my specialization of knowing," he said finally. "I am told a true experiment must test one thing only. It must permit but one element to have an effect, all others neutral, and the result must be closely observed."

"Like rats in a maze?"

Well, it made him frown, anyway. She chuckled. "They have trouble with rats; they do what they feel like doing. The rats, do, I mean."

"That is relevant to the rules of experiment?" He seemed puzzled.

"Forget it. What I'm wondering, does this directional committee want to know if I make a difference? If . . . if changing something about me will change other things?"

"If I knew—" Speaker said, "and understand clearly, I do not—I would not be allowed to say."

"But you're going to let me go home? And I can do what I want for as long as I can?"

"That is my understanding."

"And they won't do anything about my blood?"

"I am not told all things," Speaker said, the words like hard stones.

Manda grinned at his grave eyes. Maybe she knew things, maybe she didn't. "Well, if they won't fix my blood, how about a window? Deal?"

"I shall consult the directional committee," he replied.

After that, she bugged him about the window at least once each day. He took it patiently; discouragement weighed on her. She'd have given it up were it not that he not once reported a straight out denial. He stalled, he evaded, he delayed.

"What's the problem?" she demanded. She'd been here fifty, sixty, seventy days. The same bellied-out circular wall, day after day, was enough to thin the blood if it wasn't getting thin anyway. "What's so hard about a window?"

"Window is a thing for which we do not feel requirement," Speaker said. He sounded honestly mystified; well, she thought *he* was strange.

"So I'm different. Any objection?"

"In part, it was to observe that difference that you were displaced to our locus," Speaker said. "For example, if you could explain why energy sources were such a difficulty at your locus—"

"Trash it," Manda said. "You haven't said about a window."

"There has been a problem of compatibilities," Speaker said. "Strange improvisation has been needed and result not certain. Lacking surety, the directional committee has been reluctant to issue definite response."

"Double talk."

Speaker tried the phrase on his own tongue. "This is not the same as doublespeak?"

Manda's turn to frown. "I'm not sure. Don't distract me. Do I get a window? Or don't I?"

"Now, it shall be done."

"What?" Having been frustrated for so long, she had trouble believing. "Been holding back?"

"I have myself only now been informed."

"Uh huh." She'd never caught him in a straight out lie. Tricky evasions, though. "So when?"

Speaker permitted an ascetic smile—he did have a sense of humor!—and lifted a hand. Blackness exploded soundlessly to her left, taking her breath away. She sprang from her chair. A full third of the wall was gone, and a matching pie slice of the ceiling. Turning, Speaker sent another section of wall into nonexistence, and then the final third.

They stood in darkness. Not, though, total darkness. She could see his face. A million stars gave light. Stars everywhere. Overhead. All around.

A million? Gigazillions, more like it. Scattered bright all over the sky. Sharp sparks. After a long time, she remembered to breathe.

Floor still underfoot. She went to the edge, reached out. The wall should have been there—shouldn't it have?—but she couldn't find it. "It's still there, isn't it?" she asked.

"An interesting philosophical question," Speaker said somewhere behind her.

She thought about that for a while. "What happens if I . . . ?" She tried a tentative step. Nothing stopped her. She felt a sensation like a touch to her bare sole—no weight—at the floor's level. Timidly, she moved the other foot and stood on emptiness. Stars under her feet.

She looked back. Speaker was a silhouette against the scatter-jeweled dark. "What would happen if you, well, shut it again?"

"You would be enclosed," Speaker said, and did so. She stood on the floor, blinking blind in the sudden light.

"How'd you do that?"

He showed her the hand sign; a third of the wall disappeared again. "The palm must be inward, toward yourself," he said. "The mechanism should have your imprint now. Try it."

She did, and a second third of the wall went away. "But I meant . . . how's it possible?"

"The process is outside my knowing," Speaker said. "Were it within, I would not be permitted to say."

She made the final third go, too. "Neat!" she exulted, and carefully went to the edge again. She looked down, stars all the way to forever. "And I get the wall back by . . . ?"

"Palm outward," Speaker said.

"And if I go out there? And then . . . ?"

"You would be enclosed."

Boldly, she tried. It happened. She blinked in the light. She was in the center of the floor's circle. Speaker watched, his smile benign.

"What if you'd been standing here?"

He was briefly baffled. "The mechanism would accommodate," he said. "I would be another location."

"Can I do it again?"

"This is your quarters," Speaker said. "When I visit, I am guest."

"Do you like . . . ?"

"I find it strange. Interesting."

She made the walls go. The stars came. Wishing she'd learned the constellations, she searched all around. Anybody knew the Dipper, and Orion, but to find them among all these. . . .

She hadn't known there were so many stars. And . . .

Slowly, she saw now, the sky was turning. Along one part of the floor's edge, the stars were one by one nipping off. On the opposite side, they came into sight. She watched until a cluster whose shape she could remember reappeared. "Where's the Sun?" she wondered.

"Do you mean the star central to a planetary system?" Speaker asked. "Used as energy source?"

"Uh?" Choctaw again? She'd thought they'd gotten past that stage by now. "Well sure, I guess. I mean, what do you think I mean?"

He took the question as rhetorical; at least she'd taught him a few things. "We find such things not reliable," he said. "They fail. They explode."

"But how do you—?"

"The ways of doing are not in my specialization," Speaker said, "nor should I attempt to explain. Enough that you know—more than enough!—stars are a thing for which we have no need."

"Oh. Hey, marvelous!" She gave it thought for a while. "So where are we? Spaceship? Satellite? Uh . . . asteroid?"

Speaker frowned. Even in dim light she could see the planes of his face, all highlights and hollows. His scholar's mode. "Those things, please, we are hoping you will tell me what they are."

She left the walls gone, all furnishings absent. Under slowly wheeling stars they sat on their section of floor like Zen teacher and pupil, though who learned from whom was not a question she had the boldness to ask. For hours they talked; when silence came she watched the stars.

Once they ate. The larder shelf could be summoned out of nothingness as easily as from the wall; what she ate and drank she hardly knew. Coal for a furnace, she thought, and felt the weight of starlight on her soul.

Then, finally, he took his leave. "You shall need sleep," he said, unlimbering from a posture he'd kept for hours. "When you wake, the cosmic lines will lie configured; you shall be returned to your locus of origin."

The chill she felt could not have been

wind. "I'm not sure I want to," she said. "I mean, long as you've got me here, my blood . . . "

"You must," Speaker said. He created his portal through a vista of star clouds, black against the scintillated dark. "It is necessary."

Then he was gone, and his portal's dark with him. The star clouds blazed where it had been.

Well, fun while it lasted. For a time she didn't move. Sleep? How could she while the stars burned icy hard?

Impulse came. Hey, right. Rising, she caused the wardrobe shelf to appear, skinned out of her clothes and folded them and put them away and sent the shelf back to its oblivion.

Her own self, too?

She sat back down on the floor, feet tucked up, wrists relaxed against knees. She searched the stars as if among them, somewhere, existed one small spark of hope. If she sought long enough . . .

No one ever was given that much time.

Well, do it. With a thought and a careless move of the hand, she made the floor go, too. Had Speaker known she'd try that? Did he care? What kind of people was it who permitted wonder, hope, and joy not to exist in their lives?

Still, faintly, she could feel the floor's presence, touch rather than weight; neither her against it nor it against her. Not falling but floating; stars below her and above and slowly drifting all around. Quiet then, she sat, only herself and the stars, and tried to remember all the things Miss Zukolsky had said about symbols and metaphor.

Speaker woke her from sleep among the stars.

"Now?" For a moment she was disoriented. Awareness came. "I'm not dressed." She reached for the wardrobe shelf; it didn't come.

Speaker restored the walls. The light made her eyes hurt. "You must go through decontamination," he said. "You must take with you no microbes not existing at your locus."

Not hard to add it all up. "No clothes, huh?"

"You shall go with nothing but what you remember," Speaker said. "There must be minimal disturbance of the cosmic lines."

That's your problem, guy, she thought but did not say. "Mind if I have breakfast? Can I wash?"

He let her stuff herself, a breakfast and a lunch on top of it, and three cups of that warming cinnamon tea. Whatever it was they put in her food, she wanted all she could have. Nor did he object when she took longer than was needed in the bath. She'd miss that; maybe, if luck gave her the time, she could get someone to design . . .

Finally, she could delay no longer. Speaker caused the portal to appear. "Can I have the stars back?" she asked. "Just for a minute."

"If you wish."

She made them come. She looked around, everywhere but the black portal behind her. She wished she had time to count them, every one. Thousands. Godzillions. She set her feet firm.

"I'll get you yet!" she yelled, not sure at what or whom. Then, stoic, she turned. "Let's go."

Through the passageway's tickly

spray, same as when she arrived. As before, she *yeeked* with surprise as it struck her, then wiggled for delight and insisted to go through it again. Speaker indulged, then screwed on his helmet/hood and his gloves, and followed.

The chamber at the passageway's end looked unchanged. Her hospital scrubs lay in the middle of the floor, but neatly folded now. Cleaned? Who by? The refrigerator thing stood to one side and the other machine across from it. "Gotta use that again?" she asked.

"Of course," Speaker said.

This time, the top of it coming down on her made her think of a coffin lid, but she clenched teeth on the protest that would have surged up. Then she was dissolved in bright and resonant darkness, dreamy pleasures coursing through, sparkly pinpricks needling flesh and organs and deep to the bones. She wanted it to never end.

Ordinary light came again. She blinked, collected herself as if her scattered atoms had been everywhere, dropped down to the floor. The hospital scrubs lay only inches from her toes as if expected of her.

"Do I . . . ?"

"Yes," Speaker said.

Funny, the pants felt tight across the beam, and the blouse against her nubs. Well, she'd been healthy now, a while. Fifty days? Sixty? Was that all it took?

She pulled out a stitch at the neckline. Made it feel better. Maybe look better, too, but without a mirror . . .

"I look all right?" she asked.

How could she know that he nodded, wearing that hood? "Do I?"

"Flawless," he said.

Telling more than he said? Dared she hope? Being gallant, more likely (had she taught him that?), and clumsy for lack of practice. "That thing," she demanded, a hand wave behind her. "What does it do?"

"Cleanses," he said. "Removes all alien microbes, or destroys."

"I figured that. I'm wondering how—"

"It is not in my specialization," he said. "Nor would the directional committee allow—"

"Forget it," she said, and pushed past him. Get it over with. The refrigerator thing's door stood open. She hitched up; didn't want his help. Pull up the feet and twist on her butt. Hug her knees. Felt tight in here, and the metal cold. "Go ahead," she said past her shoulder. "Slam it on me."

He closed it with slow gentleness. She listened to the bolts snick.

She hugged her knees in the chilly dark.

A hum that seemed to expand into thunder. A tumbling and a turning and an off-center wobble and, at last, a slowing down. Then stillness.

Stillness and chill. Hard metal under her and against her back. The door's inflexibility against her shoulder. Wait now. They'd have someone watching for the refrigerator thing to come back, wouldn't they?

Sure they would. But what if Speaker's people—the directional committee?—had delivered her to a moment fifty years off from the time they'd taken her? Would an error that small have meaning to people who carelessly talked of infinity? Manda took a shallow breath; no way to know how long she'd have to make the air inside here last. She hugged her knees. It wasn't fair.

So easy now, to drift into sleep and never wake.

The bolt lower down clacked. Then the upper. The door swung out. "Manda." Harsh light burned her eyes.

"You all right?" he asked. "Manda?"

Ken. Ken Hafter. She remembered the name; her voice wouldn't come. Stiff knees and shoulders. She twisted around, got her feet out and down. He reached up. She slid down into his arms. His warmth warmed her.

"Sorry," he was mumbling. "Sorry."

"I'll be fine," she said. Did she believe? What reasons had she, but for hope?

"Stopped humming," he was saying. Only halfway did she hear. "Meters went zero. Left you long as we dared . . . hoped . . . "

"It's all right," she said, feeling good in his warmth and the strength of his arms.

"We tried," he said. He sounded like the captain of the football team.

She pushed away but held on so he'd know she didn't mean it to be unfriendly. "It's all right," she repeated. So she'd been put back the same instant they took her, not so much as a stitch out of place; well, if they could, any reason they shouldn't have?

"Look," Ken was saying. "Doc LeClair says they might try again. I mean, just because it didn't work once doesn't mean they won't. . . ."

"Or maybe they did all they wanted to do," Manda said, and gave him a grimacy smile. Laugh because it hurts to cry. "They didn't promise . . . "

"We can hope . . . "

"Hope for the moon, for all the good," she said, restless now. Scenes bothered her. "I want out of here."

"Don't blame you." He followed her up the steps; she took them quick, the cold concrete rough to her bare feet. A seam where her pants were tight broke a stitch; well, ignore it. Who'll notice?

Professor LeClair was waiting just inside the door of the monitor booth. Behind him stood all of Team B and more than half of the others. Most of the electronic things showed darkened panels, and the readout screens were grey. He looked ill at ease. "Manda, we're sorry," he said before she was all the way inside. "We don't know what went wrong. We'll review. It could be something very simple, and possibly we'll get another chance. The effort these . . . whoever they are . . . I'd think surely they'd . . . "

Change nothing, Manda decided. Not yet, anyway. Let them think she'd not been away.

"You really don't know," she said, straight to his eyes.

He nodded. "True." A bleak word.

She slipped past him to retrieve the sport bag from under the table, stuffed feet into her boots. The flight of steps hadn't done a thing to her breath. She felt fine, but the popped seam was going, stitch at a time, and she hated scenes like this. "My purse in here?"

"Book bag," someone remembered.

"I'll get it," Ken said, crouching to drag it out where he could work. Somehow he understood her anxiousness to get away.

Snatching her snake-eyes dice off the

table, she headed for the ladies' room.

He caught up with her in the hallway. She was walking fast, but his stride was longer. He grabbed the sport bag from her hand; it didn't weigh that much. "I'm all right," she protested, but it was either let it go or fight.

"Hey, kid," he said, honest pain.

"Manda," she corrected, not breaking stride. "I'm . . . well, almost grown up." She pushed her chest out a little, just for the joke. "And I don't want you feeling guilty. Not your fault."

"I know . . . uh, Manda. But, well, just the same . . . "

"And I don't want to talk about it. All right?"

Turning the corner, his feet slowed. Door to the ladies' just ahead. "Purdah line," she warned, imp's grin—she'd picked that up in Anthro last semester; handy invention—and took the sport bag back. A moment's significant wait and he surrendered the purse.

"I'll wait," he said. "Yell if you start not feeling good."

"Hey, guy. I'm fine."

"Ken," he corrected.

She nodded. "Ken Hafter. See? I remembered, all this long." For him it hadn't been so long, but he wouldn't know that. Laughing—got a secret!—she disappeared inside.

Soon as the door had swung shut she grabbed a paper towel and then with a finger—and some help from her tongue—scooped out all the scraps of food she'd pocketed between her teeth and the side of her mouth. Folded, the towel made an envelope, and she folded another around it. Didn't dare lose one piece. She stuffed the wad deep in her purse. Bladder felt maybe halfway to full; keep it; no telling what the medical lab would find.

Maybe she didn't need to do all that. Maybe Speaker hadn't known everything the decontamination machine did, or anyway hadn't told her. Maybe the trouble was fixed. He'd never actually said it wasn't. She didn't know.

Wasn't taking chances, either. Regardless of unknowns and the unknowable, she wasn't going to go down because she'd dropped a number.

Hospital scrubs off. Fold neatly; probably wouldn't need again, but just for luck; or keep to remember. . . .

The mirror over the washbasin still had the lipstick: "MANDA CALLAN WAS HERE." So they hadn't washed it off yet. No. That's right; they hadn't had time. She kept forgetting. Well, leave it. It would still be true.

Through the words she inspected herself. Hey, putting on some interesting weight here and there. Not bad! She made a face. Her reflection gave it back.

Bra needed adjustment and still felt small; and getting into her jeans was a difficult squeeze. Maybe she'd have to soap herself like they did for the TV commercials. She was still working at it when the rumble came—thunderstorm? This time of year?—and the building's shudder which made the doors of the toilet stalls jiggle. Sonic boom, maybe. Then the denim yielded another half inch and, by taking in her breath all the way, she got the button at the waist through its hole. Never sit down in these pants again; they'd split from hip to knee!

At least they'd fed her good.

Sweater, better leave it unbuttoned. Hang loose, so the blouse wouldn't look so tight.

She was putting on her face—had anyone noticed her skin had more color?—when Ken banged a fist on the door. "Manda! Manda!"

Thought she was taking too long; well, these jeans. "Hey, I'm fine," she turned and yelled. "Making myself presentable. You guys think it's easy?"

"It's gone," he shouted. He pulled the door open far enough for his voice to come through clear. "Got the magnet back." Like it was a disaster.

For a moment, she didn't understand. Then she did. "Well, that's it; right?"

"Maybe," he said, badly bothered. "We don't know. We—"

"Stuff it," she said; snapped shut her lip gloss and retrieved the sport bag. Tricky even to bend over.

Ken was waiting right outside, unhappy and anxious. "It just happened. Just now. Don't know much yet. Trying to . . . "

Manda planted her feet, looked straight up to his face. "I'm all right," she said. "All right?"

The way he scowled said he disagreed but was too deep in pain to speak. She nudged past and around the corner; outta there before she screamed or did something else dumb. He caught up and snagged the sport bag; didn't weigh a feather with only the scrubs and her beeper inside, but let him take it; wouldn't need either again. She walked as fast as feet would move; the hallway too long and starkly lit and echoing foot scuffs. Too many people waiting up ahead, just standing there. She wanted to shake off the hand on her shoulder but didn't because that would just hurt him more.

Professor LeClair was among the people waiting. She tried to edge around them but hadn't any luck. Ken ducked through the doorway with the sport bag and she had to face them alone.

"He's told you?" Professor LeClair asked.

Manda nodded. If she said anything, it would come out sounding wrong, and besides she didn't know enough.

"Possibly we should have left you longer in there," he said. "We don't know. We all feel terrible about this."

"Forget it," Manda said, and would have pushed onward but he stayed her with a hand.

"It's possible . . . " he said. "We hope that when they find there's been a . . . a miscue, they'll try again. Surely, after such a near success . . . "

"Maybe they got what they wanted," Manda said.

The pinch of his mouth admitted she could be right. "So . . . so please, Manda, hold on to the beeper. We should be testing the magnet again within a few days, and . . . "

Ken came back with her book bag. Also the beeper, which he pointedly placed in her hand. How he expected her to clip it to her waistband, tight as it was, she didn't know, and the pockets . . . She felt stupid standing there with it; she crammed it into her purse. Why hadn't Speaker told her what to say?

"Sure," she said, forcing a grin. "Keep in touch."

Then she'd got through the crowd. Ken was right behind with the book bag. She tried to take it, but he held on. Fight or yield. She settled for making distance.

"Nobody blames you," he said. "I'd be mad, too."

The need to tell him to leave her alone evaporated off her tongue. He felt bad enough, and maybe he didn't have any reason to feel bad. The corridor ended; quick up the steps; nice, not having to pause for breath.

Outside was bright sun and crisp air, dry crinkled leaves scraping stiffly on concrete walks. Manda breathed deep just for pleasure. Now, if she could remember her bike lock's combination after all this time . . .

Ken was still with her. He stood with the book bag while she crouched over the lock. These pants would crack like an eggshell any minute. Maybe she'd have to buy all new clothes.

That'd be fun.

The lock unsnapped. No excuse now not to stand straight and face him. "Manda?"

She reached for the book bag. Now he had to let it go, didn't he?

"Could I take you out?" he asked.

She felt dumb; should have seen he was working up to that; hadn't. Now, hand wrapped around the book bag's strap, other hand steadying her bike, she hesitated. Some guys had this weird idea that a girl whose life expectancy made insurance salesmen turn pale was ready to do anything, anytime; some took a lot of work to set straight.

He misinterpreted. "Look. I know I've got a few years on you, but . . . "

Anxiety all over his face, and something else; this guy was serious. Manda wasn't sure it was a good idea. Nice, though; he was an all right guy and, just maybe, she could start thinking in that direction.

"You know I . . . I'm not a good prospect," she said, feeling doubt, breathless.

Soberly, steady, he nodded. "I like your nerve."

Not a good argument. Well, did it matter? Sometimes logic wasn't a wise guide.

"Sure. Why not?" she heard herself saying. Suddenly she felt relaxed, easy, just an ordinary girl. "Know where to call?"

Only then did he let her take the bag; she dunked it in her bike's carrier hardly knowing it was done. "I can find out," he said. "Some things, I don't give up easy." He grinned.

Manda wasn't sure what to say. Didn't trust herself. Maybe, some time, she'd have to tell him what really happened. She hoped so. When she'd got to know him better, if she had the time. "I got an unlisted," she warned. "I mean, after that stuff in the *Record*. . . . "

"Think that'll slow me down?"

He was saying it wouldn't. Firm and utterly sincere. Just to be safe, though, she dug in her purse for one of the cards she'd had printed. "If I'm not in, keep trying. All right?"

Before she could think, he'd bent and kissed her on the mouth. She backed away quick, heart singing for joy. "Nut," she laughed, and got a foot over her bike and wheeled away before she yielded more of herself than she had to give. She wanted to dance. To shout at all the world.

* * *

Her wristwatch said the whole business hadn't used half an hour. Honest? Was she gone completely off the rails? Not until she had her bike up to speed, dodging people on the sunlit and tree-shaded walks, did she give thought to where she was going. She'd have to see Dr. Briscoe real soon, of course, and she'd have to tell him something of what happened; and the sooner she got those food scraps and maybe blood and urine samples to the lab, and anything else they wanted to take . . .

First, though, she needed time to think about things.

Experiment, Speaker had said. That teaching fellow in psych class had talked a lot about experiments. Ask a question of the Universe, he'd said; a carefully defined, controlled, precise question. Ideally, only one factor could determine what happened. Speaker had said much the same thing.

Then the teaching fellow had laughed. Put a rat in a maze, he said, and it did exactly what it pretty well pleased. Maybe it wasn't hungry. Maybe it didn't like cheese. Maybe it wanted a new girlfriend.

With people, he'd said, you didn't tell them what you were looking for, didn't tell them the governing factors you altered. In the perfect experiment, you didn't even let them know they were in an experiment. You let them do what they felt like doing.

All that, the directional committee must have known.

She hadn't needed her blood refilled, and she'd been there fifty/sixty days. She'd lost count. And she'd got a bit bigger here and there, places that made her feel good about herself, and she could pedal her bike fast enough to scare people without running out of breath. Only the drum-stretched tightness of her jeans kept her from going faster still.

So maybe she didn't know. Maybe it was hope instead of fact that made her guess the way she had. Maybe—her breath caught—they'd contrived to make her guess that way, and it was wrong. Well, so what? Play the cards you've got, figure the odds, and never mind the other guy's. Couldn't come up snake-eyes all the time.

Speaker and his friends would have to look out for themselves.

Might be hard, though, to go back to living at 110 volts after being at 220. Would she have to?

Worry about that some other time.

If she had another time.

She was back to the lit school's section of campus before she knew. Well, why not? Hamlet's problems couldn't be worse than her own. She locked her bike in the rack, grabbed book bag and purse, then skipped up the steps.

She'd missed most of the lecture; she'd have to talk to people while it was fresh in their minds. Prof. Howe's theatrical voice was explaining how Hamlet, knowing his doom, felt suddenly broken from all the fettering restraints that had imprisoned him. Now he could act, as he could not before, and . . .

Manda had thought she could quietly enter and slip unnoticed into one of the empty seats at the back. It didn't work that way. One head turned. Then another. A murmur rose. Faces looked at her like flowers welcoming the sun.

Professor Howe's voice stopped.

Manda wanted to shrink to invisibility. Even Professor Howe was looking at her now. His hand thumped the lectern.

"Young lady," he commanded. "Ms. Callan. Come up here."

He was going to kill her. Right there in front of everybody. For wrecking his lecture. Not fair.

"I will accomplish nothing more this morning," he said, "until our curiosity has been satisfied."

She'd have fled, but all those watching faces swept choice away. She had to walk the long aisle, every pair of eyes following. Leave her purse and book bag on a chair; nobody'd dare. Carpet silenced her boots. Didn't anyone want to breathe?

And what could she say?

Steps to the lectern were steep; Professor Howe reached a hand down but she sprang up easy in spite of her jeans. He even had a footstool ready to bring her chin up above the lectern's edge. He got her balanced, bent the microphone down.

"Upstaged twice in a morning," he said. "Congratulations."

"I didn't mean to," Manda said. "I . . . all I wanted was to get as much of your lecture as I could."

Echoes warned that her voice reached every corner. A scatter of giggles murmured back.

"While the rest of us sit breathless? Ms. Callan, theater is expectation. Your audience waits. What can you tell us?"

The big question. How much could she tell? Nothing? Everything? What did she know?

Even a little change, Speaker had said, could change all. One word could be enough. Wipe herself from existence, maybe. Them too. The choice was hers. Free will, infinity, and quantum randomness.

And they? Their joyless, ascetic lives amid wonders? Were they not even conscious of the vacuum at the center of their souls? Or had that, too, been part of their contrivance?

What did she truly know? Leave aside the hopes and dreams.

She fluttered a hand. "There's not much to tell," she said. "I mean, they put me in the . . . the box, and it stopped making its . . . its 'feed me' noise, and after a while they opened it and I was still here. Or there." She chuckled at her own confusion. "I'm losing track where I am."

Sounds like foot-in-the-gut groans came from out in the lecture hall. A few protesting cries. Momentarily she frowned; it wasn't their problem. Why make a fuss?

Well, some of it she could understand. Decent people, they'd hoped for her.

"That's not how to think about it," she protested. "Hey, people, listen. It's . . . it's not like I lost something just now. I mean, it's a thing I never had. I've still got some time. I don't know how much, but the same's true for everyone. One of you guys could be crossing the street and . . . and *blam!* And . . . and we've a hope I'll get another chance; or maybe the thing did what it was s'pose to, only nobody noticed; or maybe those guys in the medical center will come up with something, after all. We don't know. Nobody ever does. What's so awful about that?"

People are crazy. Now they were all on their feet applauding and yelling, and she couldn't understand what it was all about. Everything she'd said was so obvious it was dumb. She stood stunned, unable to make a protest heard.

She grabbed the microphone; made it squeal. Anything to make them shut up. "And here's another thing," she said, feeling crazy herself. "Be nice to butterflies. They don't live long, but they're beautiful, and it's a beautiful world because we've got them. All right?"

Somehow it sounded like the thing to say. Never mind it was no more logical than a kitten with a ball of yarn. Ms. Zukolsky might have understood. Out there, yelling and fists in the air, they seemed to understand, too.

Finally, Professor Howe raised hands for quiet. Reluctantly, the tumult died away.

"Upstaged and outplayed," he declared, not unpleased. "I will conclude my lecture next session. For now . . . " He paused, and some of them started putting their notebooks away. "I want to assign a paper."

Groans welcomed the news. Professor Howe ignored them.

"I shall ask you," he said slowly, "to consider Hamlet's indecision in the light of Hemingway's grace under stress. I shall particularly look forward to what this young lady has to say."

"I don't know anything special," Manda said, fearfully numb.

Professor Howe smiled a gentle, warm smile. "Are you sure?"

"I'm only me," she protested, her voice small.

But was it possible, she wondered breathless, Speaker's people wanted to know if one insignificant life made a difference? Risked all to ask the Universe that question?

She might not ever know, nor they, but that was all right, too. ■

●Man has always sacrificed truth to his vanity, comfort and advantage. He lives not by truth but by make-believe.

W. Somerset Maugham

the reference library

By Tom Easton

The Remarkables, Robert Reed, Bantam, $4.99, 344 pp. (ISBN: 0-553-29362-1).
The Mountain Made of Light, Edward Myers, ROC, $4.95, 415 pp. (ISBN: 0-451-45136-8).
China Mountain Zhang, Maureen F. McHugh, TOR, $19.95, 313 pp. (ISBN: 0-312-85271-1).
Alien Blues, Lynn S. Hightower, Ace, $4.50, 251 pp. (ISBN: 0-441-64460).
Our Lady of the Harbour, Charles de Lint, Axolotl Press (Pulphouse Publishing, Box 1227, Eugene, OR 97440), $10, 88 pp. (no ISBN).
Ray Bradbury on Stage, Ray Bradbury, Donald I. Fine, Inc., $12.95 (tp), 376 pp. (ISBN: 1-55611-305-6).
Alternate Kennedys, Mike Resnick, ed., TOR, $4.99, 166 pp. (ISBN: unknown).
After the Ring, Martin H. Greenberg, ed., TOR, $24.95, 436 pp. (ISBN: 0-312-85175-8).

"Hard" science fiction tries to stick close to what physicists, biologists, astronomers, and other scientists know about the nature of reality. When the SF writers go out on a limb, that limb is usually one the scientists have at least guessed exists, or one the writers think is a reasonable extension of a known or guessed-at limb. Not surprisingly, the writers often spend considerable time and effort defending the scientific backgrounds of their stories, sometimes giving the tales the feel more of textbooks or lectures than of novels. I suspect it is such cases that make many people say hard SF is bo-o-o-o-ring.

Yet hard SF does not have to be dreary. Its defining quality is its care not to violate what we understand of the laws of nature, *not* the lectures. It is thus quite capable of giving rise to such books as Robert Reed's latest, **The Remarkables.**

Reed begins by supposing that millennia ago, humanity tried to send slower-than-light spaceships to the stars. Unfortunately, it turned out that stars are typically so thickly surrounded by debris—from asteroids and dust clouds to cometary Oort Clouds—that most ships were never heard from again. Humanity therefore resorted to building enclosed habitats or "enworlds" from the debris, terraforming moons and comets, and expanding as the Realm more slowly across the light-years. However, in those early days, one ship did survive to reach the world of Pitcairn and meet the sentient Remarkables. This species has a marine larval stage, a mobile terrestrial juvenile stage, and a rooted adult stage with an intelligence best described as multi-viewpoint. They are something like squids and something like trees, and the adults employ symbionts to fetch them food from the sea. Unfortunately, Pitcairn's biochemistry is toxic to humans. Fortunately, the humans were able to take on the role of the food-providing symbionts, while the Remarkables found they could manufacture food humans could eat.

Now, millennia later, the Realm knows about and is fascinated by Pitcairn and its strange inhabitants, all the more so because the latter permit contact by invitation only. One of those invitations goes to Gootich, an ugly, selfish, rich terraformer. He can invite friends who are also terraformers. They will accompany a group of Pitcairns and Remarkable juveniles on a "passion," a journey that seems to be a rite of passage for the Remarkables.

The tale's narrator is one of those friends, Ranier, a man with a peculiar nanotech-induced sensitivity to others' pain that forces him to seek isolation. The other friends are Bedford and Effie, a religious couple who love each other less than they might; Pachel, a bureaucrat reluctantly assigned to gain whatever advantage she might from Pitcairn; and Lumiere, an old, old man searching for a god and an afterlife. One of the juveniles on the passion is Talker, the only juvenile who can speak with humans. The leader of the passion is Service, so energetic and competent and ruthless that perhaps the Remarkables see in him a threat to their dominance. The other Pitcairns are a surly lot, and it is no surprise when we learn that they are the bottom of the Pitcairn barrel, that other communities will try to destroy the passion, that perhaps the Remarkables hope the passion will be utterly destroyed in the wilderness. Yet there are also clues that this passion carries a weight of dreams and destiny and hope for future thriving.

Where is that hope centered? A passion is a pilgrimage to a holy mountain, where juveniles on the brink of adulthood gain a glimpse of the future from their god, the All-Answer. There is also the implacable pressure of the Realm on the Pitcairn system; sooner or later the Remarkables must find a way to cope, and perhaps that way lies with Gootich and his selfish schemes. Or perhaps . . .

I'll say no more about the plot. Reed's portrayal of a decadent Realm that has almost forgotten what it is to struggle—simply because its very immensity swamps all resistance—is almost convincing. The journey of the passion may be less arduous, despite long hikes over rigorous terrain, attacks from without, and rebellion from within, than it should be to carry the weight he ascribes to it. But his vision of the Remarkables and their human symbionts I found fascinating; with it, he joins the ranks of those SF writers who have devised aliens that might really be. And that vision more than makes up for any weaknesses in other features of the novel. The whole is a more than satisfactory addition for anyone's bookshelf.

Edward Myers does his best in **The Mountain Made of Light** to revive the old "lost-race" novel, and his best isn't bad at all. A large part of his success lies in his setting of the tale in 1921, safely before the age of air travel, space satellites, and cameras that use infrared to see through clouds. Another part lies in the quite logical process—with clear parallels in Jamaica and elsewhere—he imagines to justify his lost race: after the Spanish invasion of South America and the enslavement of the Indians, a few of the slaves fled to the rugged, inaccessible Andes, to the host of tiny valleys, to the mountains themselves, there to build a culture carved into the rock and centered on the search for the supreme and holy mountain to which the founders went long ago to prepare a paradise. Still another lies in the exquisitely convincing details of the culture, its artifacts, conflicts, rituals, and myths. One of those myths says that someday two Lowlanders will come, a Man of Knowledge and a Man of Ignorance. The first, if the people choose to follow him and not the other, will lead them at last to the holy mountain.

Myers's protagonist and narrator is Jesse O'Keefe, student anthropologist in search of a suitable site for fieldwork, thoroughly traumatized veteran of World War I, and an amateur mountain-climber. Ten thousand feet high in Peru, he runs into a strange old man, Norroi the Tirno (the Bringer, we later learn), who babbles of the Rixtirra, the Mountain-Drawn. Disgusted and alarmed, he trots off toward the heights, where he meets Forster Beckwith, an aristocratic and arrogant mountaineer with porters to carry his fine china with him to the heights. O'Keefe decides he prefers Norroi's company, returns to lower elevations, and lets the Tirno lead him to a valley on the periphery of the Rixtirra land. There he finds a hitherto unknown people, a strange language, an attractive woman translator—Aeslu—and unmistakable signs—in the form of a room full of gear dating back to the conquistadors and including the diary of a German mountaineer—that visitors to this land inevitably fail some essential test and are killed.

Things do not look hopeful. But then Aeslu and Norroi spirit him off on a long trek into the depths of the Andes. They run into Beckwith, who joins their party. It becomes clearer and clearer that O'Keefe and Beckwith are the Men of Knowledge and Ignorance. Which is which? Which the savior, which the devil? The reader is never really in doubt even though Myers does not answer the question explicitly until the end, when the three travelers are imprisoned in the City of Rope, a city built in mid-air, suspended from surrounding peaks by cables made of human hair.

This city is surely the least likely item in the whole book, for even the most modern of today's steel cables would be hard pressed to do the job Myers assigns to hair. But by the time this city appears, he has so enlisted the reader's sympathies that a spot of technical unlikeliness slides right by as the characters resign themselves to death and the story goes up in flames.

But wait! We never see any bodies, do we? Does this mean that the characters will return for a sequel or two or three? That eventually the holy mountain will indeed be reached? Perhaps even that in due time this Lost Race will confront more modern times? Watch for the Myers name. He's worth keeping an eye on.

* * *

Maureen F. McHugh's first novel draws upon an intimate familiarity with Chinese culture gained from several years of teaching in rural China and a conviction that this country, which currently holds a quarter of the human species, will play a large part in the history of the future. As the background to **China Mountain Zhang,** that history departs from our own in the next century, when economic collapse provokes a communist revolution in the USA (and elsewhere). China comes to help, and by the time of the story, its culture dominates the erstwhile US in a classically imperial mode. The top of the local heap is dominated by Chinese from China; the next layer down is the ABCs (American Born Chinese); the bottom is everyone else. All dream of returning —or going, for education, work, and wealth—to China. Most are doomed to eking out their lives in Third World American slums such as New York City.

That is where we meet the title character, named after Sun Yat Sen. He is 26 years old, a construction tech who operates his machines by "jacking in" or plugging their controls into his nervous system. He works for a banished Chinese who dreams of return and pushes his ugly daughter on Zhang in hopes that Zhang will rise enough to carry the whole family home again. But the hoped-for arrangement goes sour, partly because Zhang is determinedly gay in a very homophobic world. Zhang is fired.

Unemployed and desperate, Zhang takes a hardship post above the Arctic Circle and thus qualifies for a slot in a Chinese university. Finally the trained engineer he has dreamed of being, he returns to New York. There he meets once more the ugly daughter, samples the gay life he knew years before, looks for work, and find. . . . What?

Not happiness and fulfillment. McHugh has written a fairly traditional *Bildungsroman* or novel of growth, and while her setting is quite science fictional, marked by dramatic shifts in time and sociopolitical conditions and by new technologies related to cyberpunk SF, she has kept its form close to that of life. At the end, Zhang stands on the threshold of maturity and fulfillment. Whether he crosses the threshold is something McHugh does not say.

If I say that *China Mountain Zhang* is thus not quite a typical novel, that is not to condemn it. McHugh's world and characters come to life very effectively, her writing is more than competent enough to ensure the reader's enjoyment and continued attention, and the ending does satisfy. If there is a problem, it lies in a parallel plot line that never resolves even as much as Zhang's. She has chosen to portray, in addition to New York and Baffin Bay and China, a Chinese Communist Mars colony, settled by dissidents and volunteers, suffering—like New York—the hangover of a Cultural Revolution. Here a woman goat-farmer befriends a recent arrival and his daughter, traumatized by too many relocations. When he is threatened with shipment as a "volunteer" to the South Pole water reclamation project, she marries him. The marriage works.

The Mars story does touch Zhang's tale, but only tangentially. Because it has nothing at all to do with the working out of Zhang's fate, it violates the basic rule of storytelling that an author should put nothing in the story that is not essential to the story itself, no matter how much it might illuminate the general background. Yet McHugh seems far too good a writer to be making a mistake of this order. I am therefore inclined to guess, considering both the tangentiality of the Mars subplot and the way she leaves Zhang poised on the brink of his future, that *China Mountain Zhang* is not complete in this volume. I suspect that there will be at least one sequel in which the plots converge. Perhaps Zhang will move to Mars.

Lynn S. Hightower's **Alien Blues** presents a world to which have come the alien Elaki, shaped something like erect manta rays and more technically advanced than humans in certain areas. They are also willing to help, and their representatives are appearing throughout human society. Why, there's even one down at the police station, saying he's from the "family" of puzzle solvers, there to observe and assist. The cops are a bit suspicious, since the Elaki sometimes display a certain colonial condescension, or even speciesism, but they're stuck.

Now meet David Silver. He's one of those cops, a detective, pursuing a serial killer known as Machete Man. So is his brother-in-law, Mel. His wife, Rose, is an ex-soldier of the DEA (that's right, the war against drugs has been turned over to the military) who periodically goes off on mysterious missions for animal rights groups, brings home injured animals, and displays an altogether astonishing talent for mayhem when Machete Man shows up at home.

When another detective engaged in the hunt for Machete Man is brutally murdered, Silver finds clues that link Machete Man to a secret research project run by the Elaki and supposedly directed toward finding a cure for addictive behaviors of all kinds. It sounds benign, but all it has produced so far is a drug that is enormously more addictive than anything known before. Machete Man's victims turn out to have been related to workers at the research project. Just as ominous, residents have been disappearing from the local underground slum, snatched in the night by mysterious figures. Silver hears they are being used as guinea pigs in the drug research. A ruthlessly sadistic figure from Rose's past, Santana, seems to be involved. Some of the Elaki appear to be less than benign (making the aliens quite human).

Events connect and reinforce. Santana and Silver meet in the slum's depths as tornadoes rage overhead. A few days later, healed by nanomachines, Silver is waiting when Santana comes to a local funhouse to exchange the new drug for a California mobster's loot. And then . . .

Of course the good guys win. They always do, don't they? It's the getting there that's all the fun, and along the way Hightower has shown us an intriguing world and given us reasonable characters, a complicated plot, and a decent read. The inconsistencies in the novel are minor. Worse problems are the way scenes sometimes seem only minimally connected to each other and the way Silver's state of mind seems to lack realistic continuity. I suspect she did a lot of cut-and-pasting in her writing, and she let the seams show.

On the other hand, the seams aren't *that* obvious; if you read a bit today, a bit tomorrow, a bit next week (as many people do), you may not even notice.

Charles de Lint's **Our Lady of the Harbour** retells in the idiom of de Lint's Canadian urban fantasy the old fairy tale of the little mermaid who loves a human, pays a high price for human form, and must get the human to say "I love you" soon or die. Here the human is Matt, a painfully shy, in-drawn musician; a charmer on stage, he is totally inept off; he knows nothing of love in any form, from that of camaraderie to that of romance; indeed, he seems able to communicate only in connection with his music. Yet the mermaid, Katrina, heard him playing on the shore and knows only the stage persona. The price she pays is her beautiful voice, and hence her ability both to sing and to speak; when she arrives in the man's town, nude and mute, her cause seems quite hopeless. Or is it?

Katrina catches on to landborne life quickly enough. She is befriended by Amy, a woman who once had an unsuccessful love affair with Matt. She reaches Matt and seems on the verge of success despite Matt's pathological reserve. Katrina's deadline approaches, and. . . .

Thanks to the story's structure, the reader knows from the beginning that Matt winds up alone, rueful, remorseful, and as frozen as ever. Katrina's fate is the unknown. Does she die? Does she manage to return to the life she knew before she first heard Matt? Or does some higher power intervene to tell us that despite the legendary soullessness of those of fairy stock, music and love—even unrequited love—are soul enough?

Discovering the answer will occupy you pleasantly for an hour or so.

Ray Bradbury is renowned for his novels and short stories, but he is also a poet and screen writer. And, in case you hadn't heard, he is a playwright as well. His one-act plays are often—but not always—alternate versions of famous stories such as "The Veldt" or "The Wonderful Ice Cream Suit," and they have been collected in three small volumes, *The Anthem Sprinters and Other Antics* (1963), *The Wonderful Ice Cream Suit and Other Plays* (1972), and *Pillar of Fire and Other Plays* (1975). All three are now available in a single volume, **Ray Bradbury on Stage: A Chrestomathy of His Plays,** which preserves the afterword and two introductions from the earlier books.

Bradbury can be an exceedingly talky playwright, as in "The Foghorn," but he can also be so full of joy and verve that reading his script is almost like being in the front row on opening night, as in "The Anthem Sprinters." He also has some useful advice for those who might perform the plays. This book would thus be a perfect gift for anyone you know—including yourself—who loves or is involved with the theater.

It can't be too surprising to see on the market books with some link to the coming presidential election. Earlier this year appeared *Alternate Presidents,* edited by Mike Resnick. Now the same editor brings us **Alternate Kennedys,** in which 28 writers—including SF editors Brian Thomsen and Ginjer Buchanan—offer 27 takes on what might have been if, say, the Kennedy brothers had gone into music (and played for President Presley) or show business, if Joe Junior had lived, or Marilyn had haunted JFK, or the first Kennedy to reach Boston from Ireland had carried fairy gold, if Rosemary had not been lobotomized, if JFK's son Patrick, who died in infancy, had lived, if Watergate had played years earlier as Bobbygate, if and if and if. Some of the stories are pretty blah. Several read more like history texts. A precious few are grand exercises in the art of "what if"—take a look at Judith Tarr's "Them Old Hyannis Blues" and Jack C. Haldeman II's "Short Count in Chicago." The best story here may be Nicholas A. DiChario's "The Winterberry," in which an old man gropes after the limited reality that is all an assassin's bullet has left him. Note that this is only DiChario's second published story; as Resnick says, "This young man is going to be around for a long time, and he's only going to get better. That's almost frightening." To his competitors, that is. To readers, he may very soon seem a light in the wilderness.

Something else worth noting is that this book may be of most interest to those who remember the sixties, when the Kennedy mystique made all the world shine just a little brighter. Since then, we've learned of the flaws behind the Camelot image. But also since then, the world has turned greyer, dirtier, with flaws aplenty everywhere we turn. For some of us the mystique remains, at least in memory, and the book has an undeniable appeal.

We cannot deny the flaws, of course. They were and are real, and many of the stories here do stress them. But it is the mystique, faded though it be, that makes these stories and this book possible.

After the Ring, edited by Martin H. Greenberg and with an introduction by Jane Yolen, offers 19 "Tolkienesque" stories to commemorate the 100th anniversary of the birth of John Ronald Reuel Tolkien on January 3, 1892. Tolkien is, of course, the man responsible for *The Hobbit* and the *Lord of the Rings* trilogy (among other works). He is thus the man responsible, more than any other, for the field of modern fantasy. He is also the one to blame for the veritable flood of execrable imitations that has inundated the bookstores for the last few decades. Yet even if so many sins had not been committed in his name, he would still deserve honor heaped in plenty upon his name. After all, even Tolkien built on prior art.

Fortunately, "honor" may lie as much in the intent as in the execution. Like modern fantasy, *After the Ring* is a mixed bag containing very little that resembles Tolkien in style or voice. The bag does hold a reasonable share of hobbits, halflings, elves, and goblins, as well as some more original conceptions.

Dennis L. McKiernan escapes the slavishness of his imitations with something that looks much like a satire of imitations with "The Halfling House." Judith Tarr pleases immensely with "Death and the Lady," in which a woman self-exiled from faerie wishes at last to return; it is set fairly convincingly in a community stripped of its men by the Black Death and war. Stephen R. Donaldson's "Reave the Just" serves justice on a thoroughly piggish man. John Brunner's "In the Season of the Dressing of the Wells" does the same for a tyrannical British lady of the manor. Robert Silverberg's "A Long Night's Vigil at the Temple" confronts a far, far future priest with the true nature of the roots of his religion. In Poul and Karen Anderson's "Faith," a child raised as cattle by goblins discovers the deceptions that surround him. Peter S. Beagle's "The Naga" is a fairy tale with a shape-shifting princess. Mike Resnick's "Revolt of the Sugar Plum Fairies" is the jape it sounds like. Gregory Benford's "Down the River Road" puts people in a tubular world in which time is a literal river and a young man can, if he finds his father dead, go upstream to find him alive. Other tales —some of them quite slight—are by Terry Pratchett, Elizabeth Ann Scarborough, Patricia A. McKillip, Harry Turtledove, Andre Norton, Charles de Lint, Emma Bull, Karen Haber, Jane Yolen, and Barry N. Malzberg. A few—e.g., the Benford and McKillip tales—feel like fragments that we will see in due time as full-fledged novels.

A "veritable flood of execrable imitations"? That's what I said, and perhaps I should point out that a considerable number of others are saying the same thing. For one, Jane Yolen muttered a word or two along similar lines in her introduction to the above book. For another, just the other day I received in the mail a one-page flyer labeled "Cheaper Truth, Vol. 1, No. 2," signed only "Vox," and postmarked Texas. In brief, it said, "[W]e, the next generation . . . comment . . . that the genre has relinquished any claims it once made of literary quality. . . . [L]iterature is losing support at a rate proportional to the decline in SAT scores. . . . [W]e . . . are reconciled to the fact that to [prosper] we must write stories about comic book heroes, and endless wartime masturbations, and shameless ripoffs of Tolkien and Heinlein or the latest megabuck movie or even our own previous work. Except. . . . We grew up on the products of a brighter age . . . by people who, right or wrong, didn't swallow every simple slogan society tried to stuff down their throats. . . . They asked hard questions. . . . So we mourn a moment each day before we sit down at the computer."

That's worth a little thought from writers, editors, and readers. ■

●There are three kinds of lies: lies, damned lies, and statistics.

Mark Twain

●The last word in ignorance is the man who says of an animal or plant: What good is it?

Aldo Leopold

brass tacks

Dear Dr. Schmidt,

In the article, "Whatever Happened to the Little Ice Age?," Dec. 1991, fig. 2 mentions Camp Century cycles. However, the text does not explain the term. What is Camp Century?

I thought it was a fine article: concise, informative, and thought provoking. Fact articles like this are a major reason why I read *Analog*.

I doubt that the politicians/people will take steps necessary to correct the global warming problem. The sacrifice will be too great. Our main hope is a technological breakthrough like cheap solar power or cold fusion that will allow us to correct the problem without overall sacrifice. I have great doubts that hot fusion will ever be a practical energy source.

I dislike hot weather. I am thinking of moving to Canada. It will be the place to be in 2010.

JAMES W. MILBURN
2318 Glendale Terrace #B2
Alexandria, VA 22303-1919

The author replies. . . .

"Camp Century" is a base in Greenland where the cores that reveal the climate cycles were drilled from the ice cap. There's a simple reason why this wasn't explained in the article—I goofed.

JOHN GRIBBIN

Dear Mr. Schmidt:

John Gribbin's piece on the lack of a little Ice Age was interestingly written, but not up to date. Forget that the graphs of observed temperatures end in 1975 and that the "heat island" effect was not really taken into account at the time. The actual data does not show any real trend: from 1885 through 1984 there is no discernible trend: the mean temperature was 11.4°C. Between 1895 and 1940 the temperature rose about 0.4 degrees, between 1940 and 1970 it declined, and since 1970 there has been no clear-cut trend.[1] This information brings Gribbin's figure up to date. Over the period 1979-1990, satellite measurements of global average temperature, while variable, have shown no trend according to a graph prepared by John R. Christy of the NASA Marshall Space Flight Center.

But Gribbin will have to work hard to explain the "Plant Hardiness Zone Map" periodically produced by the Dept. of Agriculture. These maps show the low temperatures that control plant survival from year to year—they are climate maps. The 1990 map shows that the zones shown on the 1965 map are now from 5 to 10°F colder—there is no warming trend. The north line of commercially grown orange trees in Florida has been gradually moving south for the past two decades.

I could go on and cite additional information that contradicts the supposed rise in global temperature, but it would make my letter too long.

RAPHAEL G. KAZMANN

Baton Rouge, LA

Dear Stan,

I have just finished reading the article "Commercial Space: The New Cold War" by Donald F. Robertson in the November 1991 edition. A single glaring error renders the vast majority of the author's information and conclusions suspect. The author states in footnote b: "The official exchange rate for the Soviet ruble centers around R1.60 to $1.00." In the article Mr. Robertson has equated R1.3 billion with about $2.08 billion. If in fact the exchange rate is "about R1.60 to $1.00" it is impossible for these two amounts to equate. If 2 oranges equal 1 apple, 20 oranges must equal some lesser number of apples (10 to be exact). The US dollar amount must be a number smaller than the Soviet ruble amount. At an exchange rate of R1.60 to $1.00, R1.3 billion would equal $812.5 million or $.8125 billion. This is a significantly different number than $2.08 billion, actually off by a factor dividing rubles by 1.6. This error continues throughout the article. I am grateful the author related his conversion factor, otherwise a significant amount of inaccurate information would have been accepted at face value. Also, this one simple error brings into question all of the values the author mentioned because I do not know if he has translated the values or cited specific values from his research. If his conversions are incorrect, then the conclusion that "the Russians have been more successful than I think anyone suspected was possible" is erroneous. Reducing their income by a factor of 2.56 would change the picture dramatically.

If on the other hand, the author merely misstated his exchange rate, and the real exchange rate is R1.00 to $1.60, then all of his numbers have been correctly converted and I can read the article again without the disturbance of trying to correct all of the numbers. The only adjustment necessary would be for the "real" exchange rate.

Question: Isn't the job of the editorial staff to "catch" such glaring errors before publication?

One other pet peeve, why does the author refer to the USSR and people of the USSR as "Soviet Union" and "Soviets" on some occasions and as "Russia" and "Russians" on other occasions? The former is proper for the time period of this article. The latter is a misnomer at best. How the socio/economic/political organization of the former USSR proceeds is anyone's guess so that future references will have to be adapted to the situation appropriate at that time.

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[1] Jastrow, R., Nierenberg, W., and Seitz, F., 1990, *Scientific Perspectives on the Greenhouse Problem,* p. 38, fig. 5 Jameson Books, Ottawa, Ill.

This article aside, I am a great fan of *Analog* and enjoy my monthly journey of entertainment and enlightenment.

GREGORY GONDA

Champaign, IL

The author replies. . . .

Dear Stan:

Gregory J. Gonda is correct in his critique of my November 1991 *Analog* article "Commercial Space: the New Cold War." I just called a representative of the Soviet government bank in New York and was told that the correct official exchange rate for the ruble was $1.60 to R1.00, not the other way around. I apologize to all concerned for this error, which is entirely my own, and should have been obvious since the Soviets had long pretended that the ruble was worth more than the dollar. The article was written before the recent devaluations of the ruble, which have reduced even its official value to a minute fraction of the old figure.

I do not agree with Gonda, though, when he states that this error invalidates my conclusions. So as not to overstate my case, throughout the article I tried to make clear that Soviet commercial earnings are tiny compared to their expenditures. This relative fact is true whatever value the ruble has in relation to the dollar. Nor does my error change the fact that the Soviets have earned significant hard currency from space station services. The Soviets have proven the existence of a small but crucial commercial market in human spaceflight that many—including myself—did not expect to emerge until humanity was far better established in cis-Lunar space. This bodes very well for the long-term future of commercial spaceflight.

Regarding the use of "Soviet" and "Russian," I did that for three reasons. The first was a purely stylistic one: to avoid having to use the same word too often. Secondly, the space program is primarily a Russian program, with only minor inputs from the other Republics. Third, the article was written before the Soviet Union actually began to fall apart. At that time the Russian Republic dominated life in the Soviet empire (and it will continue to do so in any organization—or lack thereof—that follows the Soviet Union).

I tried to use "Soviet" to refer to party members and Communist organizations; and "Russian" to refer to non-party individuals inhabiting the empire and to components of the culture that were not necessarily ideologically Communist. I agree that would not be appropriate today; it seemed reasonable at the time. What is the term for an inhabitant of the Soviet Union who was not a Communist party member? This is a distinction neither Soviets nor Americans choose to make, and I don't think there is one.

DONALD F. ROBERTSON

Dear Mr. Schmidt

When I set out to read the November issue of *Analog*, I didn't get past your editorial. It seems to suggest that we should consider accepting a "large-scale central management" of our lives by a computer, on the grounds that the fast response time would make it somehow better than the central planning of, say, the Soviet Union.

I think you do your readers a disservice by throwing out such a proposition without explaining the assumptions behind it.

1. Does anyone want his/her life run

by some central authority, be it a despotic human czar or a despotic computer programmer?

2. Does anyone want the uncertainty of a fast-response-time socio-economic system? How quickly, for example, would you want your wages adjusted? Daily? Weekly?

3. Wouldn't the humans involved strive mightily to "out-smart" the computer? For example, the price of, say, toilet paper at the company store on Station 37, in the asteroid belt, can be instantly adjusted by computer. It might, for example, raise the price as stocks were consumed, to reflect scarcity; or it might lower the price, to encourage emptying the stock room by the time the next resupply ship docks. Don't you suppose that would immediately lead to "game playing"? Some would hoard toilet paper, or try to deceive the computer, if only for the challenge of it, as today's hackers challenge computer systems. Would you enjoy living in an environment where the price of toilet paper is constantly varying to reflect "central management"? If, of course, the computer is "human" enough to use its absolute control, its monopoly, to maximize profits for the company creating, for example, an artificial scarcity of toilet paper and then raising the price, wouldn't you have the urge to complain? How does one complain to a computer? Will it listen?

I suppose I could write a chilling SF story about life in such a computer-controlled environment, but I doubt that you would buy it.

ERIK S. BUCK

Dayton, OH

Had you read what I wrote, all the way through and with attention to detail, you would know that I did *explain in considerable detail the reasoning that led me to the suggestion that hit your hot button. You would also know that I don't much like it, either.*

This seems like a good time to remind everybody that Analog *editorials are not intended to sell a particular course of action. They're intended to get readers to* think *about alternatives. That often involves questioning assumptions that are usually taken for granted—and to get people to do that, I'm not above throwing out suggestions that I personally find unappealing or worse.*

Evidently it worked: you have *started thinking about it. But I was hoping you'd actually address the points that led me to that suggestion, instead of simply telling me why you hate it.*

And yes, a story is a perfectly good way to do that, and I might *buy it. I can't promise it, of course; it depends on how well you write it and what the competition is when it arrives. But a secondary purpose I always have in mind in writing an editorial is the hope that it will annoy somebody into writing a good story!*

Dear Dr. Schmidt,

I've been getting so many of your computerized renewal notices, that I suppose an explanation is in order. After a long and, until recently, satisfactory relationship with *Analog*, I believe it is time for me to take my few pennies a day elsewhere.

I am a born-again Christian, and I enjoy "hard" science fiction. I have not found this mutually exclusive until lately. It seems to me that in almost every issue for about the last year, there has been at least one story that in some way "bashed" those of us who believe in a supreme God, creator of the Universe.

Perhaps this is a reflection of the writers who submit material to you. Perhaps in my old age I'm more sensitive to such denigration. Perhaps (I suspect) it is a reflection of your editorial bias. I don't recall noticing this bias from Ben Bova.

I'm voting with my checkbook, even though I am in such a small market group that you will never know I'm gone. (I'm really going to miss you guys.)

DON KREBS

8348 Highlandview
Universal City, TX 78148

We have published no stories that in any way attacked people for believing in God. There were a few that attacked people who attempted to impose dictates of their religious beliefs on others who did not share them. That is an entirely different matter, and it's a reflection of the times. Many of the writers, and I, are disturbed by the fact that we have been seeing an increasing amount of that in real life, and that tends to get reflected in stories.

But please note very carefully: our objection is not to belief in God, but to the attempt to impose beliefs on others. Our objection to that would be just as strong regardless of the nature of the belief, and we have no objection to devout believers who don't attempt to dictate the behavior of those who believe differently. If the attempt-to-impose and religion often occur together in stories, that merely reflects the fact that they have often occurred together in recent history. We haven't forgotten that either can occur without the other.

Dear Stan:

The letter in Brass Tacks mid-December 1991 issue has it wrong again. Curt Phillips at least knows that Phil Klass is still alive; but Phil and Fruma are not living in Florida.

They are living in Pennsylvania, where Phil has been living in one city or another for donkey's years. He's never mentioned Florida to me, never. And I'm in touch with him frequently.

VIRGINIA KIDD ■

●For everything you have missed, you have gained something else; and for everything you gain, you lose something else.

Ralph Waldo Emerson

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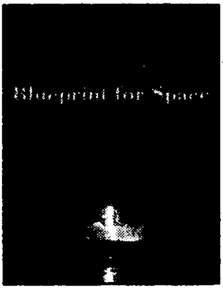
Edited by Frederick I. Ordway III and Randy Liebermann



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a calendar of analog upcoming events

17-19 July
CON-VERSION IX (Alberta SF conference) at Westin Hotel, Calgary, Alta. Guest of Honour—David Brin; Canadian Guest of Honour—Michael Coney; TM—Peter David. Info: Con-Version IX, Box 1088, Station M, Calgary AB Canada T2P 2K9.

17-19 July
DRAGON CON (Atlanta SF and Comics Convention) at Atlanta Hilton and Towers, Atlanta, Ga. Guests include 4sj Ackerman, Raymond E. Feist, George R. R. Martin, Thomas Canty, Neil Gaiman. Forry J Ackerman Roast and Awards, Betty Page Look-A-Like Contest, D&D Tournament. Registration—$30 until 15 June, $35 at the door. Banquet (Friday night) tickets—$22. Info: Dragon Con '92, Box 47696, Atlanta GA 30362-0696 (include a SASE). (404)249-6400 (ticketmaster); (404)925-2813 (info).

17-19 July
GAYLAXICON IV (SF conference for gay/lesbian fans and their friends) at Guest Quarters Suite Hotel, Philadelphia, Penna. Artist Guest of Honor—Tristan Alexander. Registration—$25 until 30 June, $30 at the door. Info: Gaylaxicon IV, Box 656, Washington DC 20044.

24-26 July
OKON 15 (Oklahoma SF conference) at Tulsa, Okla. Guest of Honor—Elizabeth Ann Scarborough; Artist Guest of Honor—David Lee Anderson; Fan Guest of Honor—K. D. Wentworth; Music Guest of Honor—Diana Gallagher; TM—William Mark Simmons. Registration—$15 until 30 June, $20 at the door. Info: OKon '92, Box 4229, Tulsa OK 74159, (918)622-2225.

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31 July-2 August
RIVERCON XVII (Louisville area SF conference) at Hyatt Regency, Louisville, Ky. Guest of Honor—Mercedes Lackey; Art Guest of Honor—Douglas Chaffee; Fan Guest of Honor—Laurie Mann; TM—Bruce Pelz. Registration—$18 until 15 July, $25 thereafter. Info: Rivercon, Box 58009, Louisville KY 40268-0009.

3-7 September
MAGICON (50th World Science Fiction Convention) at Orange County Civic & Convention Center, Orlando, Fla. Guest of Honor—Jack Vance; Artist Guest of Honor—Vincent Di Fate; Fan Guest of Honor—Walter A. Willis. Registration—$110 adult/$55 child until 15 July 1992; $135 adult/$75 child at the door. Supporting—$25. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: MagiCon, Box 621992, Orlando FL 32862-1992. (407)859-8421. UK agent Peter Weston, 14 St. Bernard's Road, Sutton Coldfield B72 1LE, UK.

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29 October-1 November
WORLD FANTASY CONVENTION at Callaway Gardens, Pine Mountain, Ga. Guests: Anne McCaffrey, Michael Bishop, John Farris, Martin H. Greenberg. Limited membership. Registration—$100 in advance; NO at-door memberships. Info: World Fantasy Convention 92, Box 148, Clarkston GA 30021. (include SASE)

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—Anthony Lewis

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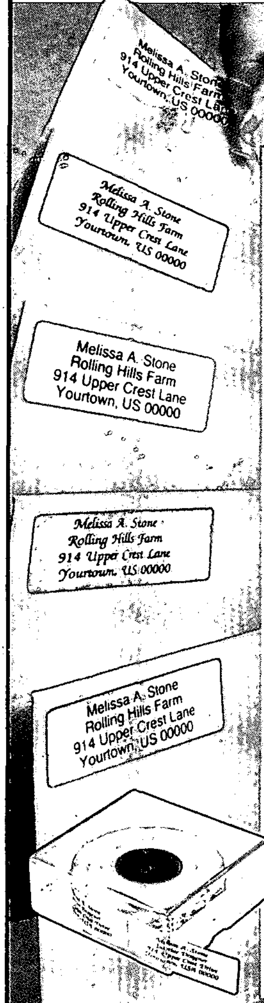

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